

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 July 2001 (05.07.2001)

PCT

(10) International Publication Number
WO 01/48192 A1

- (51) International Patent Classification⁷: C12N 15/11
- (21) International Application Number: PCT/NZ00/00256
- (22) International Filing Date:
21 December 2000 (21.12.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/171,678 23 December 1999 (23.12.1999) US
09/724,864 28 November 2000 (28.11.2000) US
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— *With international search report.*
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: POLYNUCLEOTIDES, POLYPEPTIDES EXPRESSED BY THE POLYNUCLEOTIDES AND METHODS FOR THEIR USE

(57) Abstract: Novel polynucleotides including partial and extended sequences, and open reading frames, are provided, together with probes and primers, DNA constructs comprising the polynucleotides, biological materials and organisms incorporating the polynucleotides, polypeptides expressed by the polynucleotides, and methods for using the polynucleotides and polypeptides.

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POLYNUCLEOTIDES, POLYPEPTIDES EXPRESSED BY THE POLYNUCLEOTIDES AND METHODS FOR THEIR USE

5 Technical Field of the Invention

This invention relates to polynucleotides believed to be novel, including partial, extended and full length sequences, as well as probes and primers, genetic constructs comprising the polynucleotides, biological materials incorporating the polynucleotides, polypeptides expressed by the polynucleotides, and methods for
10 using the polynucleotides and polypeptides.

Background of the Invention

Sequencing of the genomes, or portions of the genomes, of numerous biological materials, including humans, animals, microorganisms and various
15 plant varieties, has been and is being carried out on a large scale. Polynucleotides identified using sequencing techniques may be partial or full-length genes, and may contain open reading frames, or portions of open reading frames, that encode polypeptides. Putative polypeptides may be determined based on polynucleotide sequences. The sequencing data relating to polynucleotides thus represents
20 valuable and useful information.

Polynucleotides may be analyzed for various degrees of novelty by comparing identified sequences to sequences published in various public domain databases, such as EMBL. Newly identified polynucleotides and putative polypeptides may also be compared to polynucleotides and polypeptides
25 contained in public domain information to ascertain homology to known polynucleotides and polypeptides. In this way, the degree of similarity, identity or homology of polynucleotides and polypeptides of unknown function may be determined relative to polynucleotides and polypeptides having known functions.

Information relating to the sequences of isolated polynucleotides may be
30 used in a variety of ways. Specified polynucleotides having a particular sequence may be isolated, or synthesized, for use in *in vivo* or *in vitro* experimentation as

probes or primers. Alternatively, collections of sequences of isolated polynucleotides may be stored using magnetic or optical storage medium, and analyzed or manipulated using computer hardware and software, as well as other types of tools.

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Summary of the Invention

The present invention relates to polynucleotide sequences identified in the attached Sequence Listing as SEQ ID NOS: 1-35, variants of those sequences, extended sequences comprising the sequences set out in SEQ ID NOS: 1-35 and
10 their variants, probes and primers corresponding to the sequences set out in SEQ ID NOS: 1-35 and their variants, polynucleotides comprising at least a specified number of contiguous residues of any of the polynucleotides identified as SEQ ID NOS: 1-35 (x-mers), and extended sequences comprising portions of the sequences set out in SEQ ID NOS: 1-35, all of which are referred to herein,
15 collectively, as "polynucleotides of the present invention."

The polynucleotide sequences identified as SEQ ID NOS: 1-35 were derived from mammalian sources, namely, from mouse airways induced eosinophilia, rat dermal papilla and mouse stromal cells. Some of the polynucleotides of the present invention are "partial" sequences, in that they do
20 not represent a full-length gene encoding a full-length polypeptide. Such partial sequences may be extended by further analyzing and sequencing the EST clones from which the sequences were obtained, or by analyzing and sequencing various DNA libraries (e.g. cDNA or genomic) using primers and/or probes and well known hybridization and/or PCR techniques. The partial sequences identified as
25 SEQ ID NOS: 1-35 may thus be extended until an open reading frame encoding a polypeptide, a full-length polynucleotide and/or gene capable of expressing a polypeptide, or another useful portion of the genome is identified. Such extended sequences, including full-length polynucleotides and genes, are described as
30 "corresponding to" a sequence identified as one of the sequences of SEQ ID NOS: 1-35 or a variant thereof, or a portion of one of the sequences of SEQ ID NOS: 1-35 or a variant thereof, when the extended polynucleotide comprises an identified

sequence or its variant, or an identified contiguous portion (x-mer) of one of the sequences of SEQ ID NOS: 1-35 or a variant thereof.

The polynucleotides identified as SEQ ID NOS: 1-35 were isolated from mouse and rat cDNA clones and represent sequences that are expressed in the tissue from which the cDNA was prepared. The sequence information may be used to isolate or synthesize expressible DNA molecules, such as open reading frames or full-length genes, that can then be used as expressible or otherwise functional DNA in transgenic mammals and other organisms. Similarly, RNA sequences, reverse sequences, complementary sequences, anti-sense sequences and the like, corresponding to the polynucleotides of the present invention, may be routinely ascertained and obtained using the cDNA sequences identified as SEQ ID NOS: 1-35.

In a first aspect, the present invention provides isolated polynucleotide sequences comprising a polynucleotide selected from the group consisting of: (a) sequences recited in SEQ ID NO: 1-35; (b) complements of the sequences recited in SEQ ID NO: 1-35; (c) reverse complements of the sequences recited in SEQ ID NO: 1-35; (d) reverse sequences of the sequences recited in SEQ ID NO: 1-35; (e) sequences having either 40%, 60%, 75% or 90% identical nucleotides, as defined herein, to a sequence of (a) – (d); probes and primers corresponding to the sequences set out in SEQ ID NO: 1-35; polynucleotides comprising at least a specified number of contiguous residues of any of the polynucleotides identified as SEQ ID NO: 1-35; and extended sequences comprising portions of the sequences set out in SEQ ID NO: 1-35; all of which are referred to herein as “polynucleotides of the present invention”. The present invention also provides isolated polypeptide sequences identified in the attached Sequence Listing as SEQ ID NO: 36-65; polypeptide variants of those sequences; and polypeptides comprising the isolated polypeptide sequences and variants of those sequences.

In another aspect, the present invention provides genetic constructs comprising a polynucleotide of the present invention, either alone, or in combination with one or more additional polynucleotides of the present invention,

or in combination with one or more known polynucleotides, together with cells and target organisms comprising such constructs.

The polynucleotides identified as SEQ ID NOS: 1-35 may contain open reading frames ("ORFs") or partial open reading frames encoding polypeptides. Additionally, open reading frames encoding polypeptides may be identified in extended or full-length sequences corresponding to the sequences set out as SEQ ID NOS: 1-35. Open reading frames may be identified using techniques that are well known in the art. These techniques include, for example, analysis for the location of known start and stop codons, most likely reading frame identification based on codon frequencies, etc. Suitable tools and software for ORF analysis are available, for example, on the Internet at <http://www.ncbi.nlm.nih.gov/gorf/gorf.html>. Open reading frames and portions of open reading frames may be identified in the polynucleotides of the present invention. Once a partial open reading frame is identified, the polynucleotide may be extended in the area of the partial open reading frame using techniques that are well known in the art until the polynucleotide for the full open reading frame is identified. Thus, polynucleotides and open reading frames encoding polypeptides may be identified using the polynucleotides of the present invention.

Once open reading frames are identified in the polynucleotides of the present invention, the open reading frames may be isolated and/or synthesized. Expressible DNA constructs may then be constructed that comprise the open reading frames and suitable promoters, initiators, terminators, etc., which are well known in the art. Such DNA constructs may be introduced into a host cell to express the polypeptide encoded by the open reading frame. Suitable host cells may include various prokaryotic and eukaryotic cells.

Polypeptides encoded by the polynucleotides of the present invention may be expressed and used in various assays to determine their biological activity. Such polypeptides may be used to raise antibodies, to isolate corresponding interacting proteins or other compounds, and to quantitatively determine levels of interacting proteins or other compounds.

In another aspect, the present invention provides isolated polypeptides encoded, or partially encoded, by the above polynucleotides. As used herein, the term "polypeptide" encompasses amino acid chains of any length, including full-length proteins, wherein the amino acid residues are linked by covalent peptide bonds. The term "polypeptide encoded by a polynucleotide" as used herein, includes polypeptides encoded by a polynucleotide that comprises an isolated polynucleotide sequence or variant provided herein. Polypeptides of the present invention may be naturally purified products, or may be produced partially or wholly using recombinant techniques. Such polypeptides may be glycosylated with bacterial, fungal, mammalian or other eukaryotic carbohydrates or may be non-glycosylated. In specific embodiments, the inventive polypeptides comprise an amino acid sequence selected from the group consisting of SEQ ID NO: 36-65.

Polypeptides of the present invention may be produced recombinantly by inserting a polynucleotide sequence that encodes the polypeptide into a genetic construct and expressing the polypeptide in an appropriate host. Any of a variety of genetic constructs known to those of ordinary skill in the art may be employed. Expression may be achieved in any appropriate host cell that has been transformed or transfected with a genetic construct containing a polynucleotide that encodes a recombinant polypeptide. Suitable host cells include prokaryotes, yeast, and higher eukaryotic cells. Preferably, the host cells employed are *Escherichia coli*, insect, yeast, or a mammalian cell line such as COS or CHO. The polynucleotide sequences expressed in this manner may encode naturally occurring polypeptides, portions of naturally occurring polypeptides, or other variants thereof.

In a related aspect, polypeptides are provided that comprise at least a functional portion of a polypeptide having an amino acid sequence encoded by a polynucleotide of the present invention. As used herein, the "functional portion" of a polypeptide is that portion which contains the active site essential for affecting the function of the polypeptide, for example, the portion of the molecule that is capable of binding one or more reactants. The active site may be made up

of separate portions present on one or more polypeptide chains and will generally exhibit high binding affinity.

Functional portions of a polypeptide may be identified by first preparing fragments of the polypeptide by either chemical or enzymatic digestion of the polypeptide, or by mutation analysis of the polynucleotide that encodes the polypeptide and subsequent expression of the resulting mutant polypeptides. The polypeptide fragments or mutant polypeptides are then tested to determine which portions retain biological activity, using, for example, the representative assays provided below.

Portions and other variants of the inventive polypeptides may also be generated by synthetic or recombinant means. Synthetic polypeptides having fewer than about 100 amino acids, and generally fewer than about 50 amino acids, may be generated using techniques well known to those of ordinary skill in the art. For example, such polypeptides may be synthesized using any of the commercially available solid-phase techniques, such as the Merrifield solid-phase synthesis method, where amino acids are sequentially added to a growing amino acid chain. See Merrifield, *J. Am. Chem. Soc.* 85:2149-2154, 1963. Equipment for automated synthesis of polypeptides is commercially available from suppliers such as Perkin Elmer/Applied BioSystems, Inc. (Foster City, California), and may be operated according to the manufacturer's instructions. Variants of a native polypeptide may be prepared using standard mutagenesis techniques, such as oligonucleotide-directed, site-specific mutagenesis (Kunkel, *Proc. Natl. Acad. Sci. USA* 82:488-492, 1985). Sections of polynucleotide sequence may also be removed using standard techniques to permit preparation of truncated polypeptides.

In general, the polypeptides disclosed herein are prepared in an isolated, substantially pure, form. Preferably, the polypeptides are at least about 80% pure, more preferably at least about 90% pure, and most preferably at least about 99% pure. In certain embodiments, described in detail below, the isolated polypeptides are incorporated into pharmaceutical compositions or vaccines.

The present invention also contemplates methods for modulating the polynucleotide and/or polypeptide content and composition of an organism, such methods involving stably incorporating into the genome of the organism a construct containing DNA of the present invention. In one embodiment, the target
5 organism is a mammal, preferably a human, for example for human gene therapy. In a related aspect, a method for producing an organism having an altered genotype or phenotype is provided, the method comprising transforming a cell with a DNA construct of the present invention to provide a transgenic cell, and cultivating the transgenic cell under conditions conducive to regeneration and
10 mature organism growth.

The isolated polynucleotides of the present invention have utility in genome mapping, in physical mapping, and in positional cloning of genes. Additionally, the polynucleotide sequences identified as SEQ ID NOS: 1-35 and their variants may be used to design oligonucleotide probes and primers.
15 Oligonucleotide probes and primers have sequences that are substantially complementary to the polynucleotide of interest over a certain portion of the polynucleotide. Oligonucleotide probes designed using the polynucleotides of the present invention may be used to detect the presence and examine the expression patterns of genes in any organism having sufficiently similar DNA and RNA
20 sequences in their cells using techniques that are well known in the art, such as slot blot DNA hybridization techniques. Oligonucleotide primers designed using the polynucleotides of the present invention may be used for PCR amplifications. Oligonucleotide probes and primers designed using the polynucleotides of the present invention may also be used in connection with various microarray
25 technologies, including the microarray technology of Affymetrix (Santa Clara, CA).

The polynucleotides of the present invention may also be used to tag or identify an organism or reproductive material therefrom. Such tagging may be accomplished, for example, by stably introducing a non-disruptive non-functional
30 heterologous polynucleotide identifier into an organism, the polynucleotide comprising one of the polynucleotides of the present invention.

Detailed Description

Polynucleotides were isolated by high throughput sequencing of cDNA libraries prepared from mouse airway-induced eosinophilia, rat dermal papilla and mouse stromal cells as described below, in Example 1. Isolated polynucleotides of the present invention include the polynucleotides identified as SEQ ID NOS: 1-35; isolated polynucleotides comprising a polynucleotide sequence selected from the group consisting of SEQ ID NOS: 1-35; isolated polynucleotides comprising at least a specified number of contiguous residues (x-mers) of any of the polynucleotides identified as SEQ ID NOS: 1-35; polynucleotides complementary to any of the above polynucleotides; anti-sense sequences corresponding to any of the above polynucleotides; and variants of any of the above polynucleotides, as that term is described in this specification. The present invention also provides isolated polypeptide sequences identified in the attached Sequence Listing as SEQ ID NO: 36-65; polypeptide variants of those sequences; and polypeptides comprising the isolated polypeptide sequences and variants of those sequences.

The correspondence of isolated polynucleotides encoding isolated polypeptides of the present invention, and the functionality of the polypeptides, are shown, below, in Table 1.

Table 1

SEQ ID NO Poly-nucleotides	SEQ ID NO Poly-peptides	Activity Category	Functionality
1	36	Secretory molecule	Hypothetical 131.1 kDa protein
2	37	Secretory molecule/cytokine/cell signaling	ZCYTO7 belongs to a family of IL-17-related cytokines differing in patterns of expression and proinflammatory responses that may be transduced through a cognate set of cell surface receptors. IL-17 is a T cell-derived cytokine that may play an important role in the initiation or maintenance of the proinflammatory response. Whereas expression of IL-17 is restricted to activated T cells, the IL-17 receptor is found to be

			widely expressed, a finding consistent with the pleiotropic activities of IL-17.
3	38	Secretory molecule	Novel
4	39	Receptor/cytokine/ cell signaling	Tumor endothelial marker 1 precursor
5	40	Secretory molecule	ERO1-L (ERO1-like protein) is involved in oxidative endoplasmic reticulum (ER) protein folding in mammalian cells. Oxidizing conditions must be maintained in the ER to allow the formation of disulfide bonds in secretory proteins. A family of conserved genes, termed ERO for ER oxidoreductins, plays a key role in this process. ERO1-L is a type II integral membrane protein.
6	41	Secretory molecule	Novel
7	42	Receptor/transcription factor	EMR2 is an EGF-like module that is part of the epidermal growth factor (EGF)-TM7 proteins, which also include EMR1, (EGF-like molecule containing mucin-like hormone receptor 1) F4/80, and CD97. These proteins constitute a recently defined class B GPCR subfamily and are predominantly expressed on leukocytes. These molecules possess N-terminal EGF-like domains coupled to a seven-span transmembrane (7TM) moiety via a mucin-like spacer domain. EMR2 contains a total of five tandem EGF-like domains and expresses similar protein isoforms consisting of various numbers of EGF-like domains as a result of alternative RNA splicing. EMR2 share many characteristics with CD97, including highly homologous EGF-like domains and identical gene organization, indicating that both genes are the products of a recent gene duplication event. Both EMR2 and CD97 are highly expressed in immune tissues; however, unlike

			CD97, which is ubiquitously expressed in most cell types, EMR2 expression is restricted to monocytes, macrophages
8	43	Secretory molecule/ cell structure/motility, extracellular matrix	Bone/cartilage proteoglycan I (BGN) is also known as biglycan or PG-S1. BGN is found in the extracellular matrices of several connective tissues, especially in articular cartilages. The two glycosaminoglycan chains attached to BGN can be either chondroitin sulfate or dermatan sulfate. BGN belongs to the small interstitial proteoglycans family. BGN is a small leucine-rich proteoglycan and is a nonfibrillar extracellular matrix component with functions that include the positive regulation of bone formation. It is synthesized as a precursor with an NH(2)-terminal propeptide that is cleaved to yield the mature form found in vertebrate tissues. Bone morphogenetic protein-1 (BMP-1) cleaves proBGN at a single site, removing the propeptide and producing BGN. Soluble BGN purified from rat thymic myoid cells had hemopoietic activity capable of inducing preferential growth and differentiation of monocytic lineage cells from various hemopoietic sources, including brain microglial cells. The haemopoietic BGN plays an important role in generating brain-specific circumstances for development of microglial/monocytic cells
9	44	Secretory molecule	Tubulointerstitial nephritis antigen (TIN-ag) is a basement membrane glycoprotein reactive with autoantibodies in some forms of immunologically mediated human tubulointerstitial nephritis. TIN1 and TIN2 are alternatively spliced products of the TIN-Ag gene. The

			<p>open reading frames of TIN1 and TIN2 indicates the presence of a signal peptide and putative pre-propeptide and both forms contain putative calcium-binding sites. TIN1 additionally contains a characteristic laminin-like epidermal growth factor (EGF) motif and significant homology within the carboxy terminus with the cysteine proteinase family of enzymes. The EGF motif bears important similarities in the positions of cysteines with two motifs in the propeptide of von Willebrand factor. The EGF motif and part of the region that is homologous with the cysteine proteinase family are removed from the TIN2 cDNA. The rest of the TIN1 and TIN2 sequences are identical. TIN-ag is expressed mainly in the kidney and in the intestinal epithelium.</p>
10		Receptor-like molecule	Novel
11	45	Secretory molecule/ gene/protein expression, RNA synthesis, transcription factors	<p>Toso is a cell surface, specific regulator of Fas-induced apoptosis in T cells. Fas is a surface receptor that can transmit signals for apoptosis. Toso is expressed in lymphoid cells and expression is enhanced after cell-specific activation processes in T cells. Toso appeared limited to inhibition of apoptosis mediated by members of the TNF receptor family and was capable of inhibiting T cell self-killing induced by TCR activation processes that up-regulate Fas ligand. Toso inhibits caspase-8 processing, the most upstream caspase activity in Fas-mediated signaling, potentially through activation of cFLIP. Toso therefore serves as a novel regulator of Fas-mediated apoptosis and may act as a regulator of cell fate in T cells and</p>

			other hematopoietic lineages.
12	46	Secretory molecule/ gene/protein expression, RNA synthesis, transcription factors	<p>Surface glycoprotein CD59 is a phosphatidyl-inositol-glycan-anchored glycoprotein involved in T-cell activation and restriction of complement-mediated lysis. It is also known as protectin, and is ubiquitously expressed on benign and malignant cells. CD59 inhibits complement (C)-mediated lysis of target cells by preventing the formation of the membrane attack complex, in the terminal step of C-activation. Recent experimental evidence demonstrates that CD59 is the main restriction factor of C-mediated lysis of malignant cells of different histotypes. Additionally, a soluble form of CD59, that retains its anchoring ability and functional properties, has been identified in body fluids and in culture supernatants of different malignant cells. CD59 may protect neoplastic cells from C-mediated lysis, contributing to their escape from innate C-control and to tumor progression. The expression of CD59 by neoplastic cells may contribute to impair the therapeutic efficacy of C-activating monoclonal antibodies (mAb) directed to tumor-associated antigens. CD59 can be utilized to improve the therapeutic efficacy of clinical approaches of humoral immunotherapy with C-activating mAb in human malignancies.</p>
13	47	Secretory molecules/cell or organism defense, homeostasis, detoxification	<p>Cytochrome B561 (cyb561) is a secretory vesicle-specific electron transport protein unique to neuroendocrine secretory vesicles. It binds two heme groups non-covalently and is an integral membrane protein. It acts as an electron channel and mediates</p>

			equilibration of ascorbate-semidehydroascorbate inside the secretory vesicle with the ascorbate redox pair in the cytoplasm. The role for this function is to regenerate ascorbate inside the secretory vesicle for use by monooxygenases. The secretory vesicles contain catecholamines and amidated peptides. Cyb561 belongs to the eukaryotic b561 family.
14	48	Secretory molecule	Novel
15	49	Receptor-like molecule/ gene or protein expression, RNA synthesis, transcription factor	High affinity immunoglobulin epsilon receptor beta-subunit (FCER1) is also known as IgE Fc receptor, beta-subunit, FCER1b or FCE1b. FCER1 binds to the Fc region of immunoglobulins epsilon and is a high affinity receptor. FCER1 plays a role in initiating the allergic response where binding of allergen to receptor-bound IgE leads to cell activation and the release of mediators, such as histamine. FCER1 is responsible for the manifestations of allergy and induces the secretion of important lymphokines. It functions as a tetramer consisting of an alpha chain, a beta chain, and two disulfide-linked gamma chains and is an integral membrane protein. Variants of the FCER1B gene have been identified, which are associated with an increased risk of developing atopy and bronchial asthma. Atopic dermatitis is a common skin disease frequently associated with allergic disorders such as allergic rhinitis and asthma.
16	50	Receptor-like molecule	Hypothetical 10.3 kDa protein
17	51	Secretory molecule/antigen processing	Lysosomal thiol reductase IP30 catalyzes disulfide bond reduction both <i>in vitro</i> and <i>in vivo</i> and is optimally active at acidic pH. IP30

			is important in disulfide bond reduction of proteins delivered to MHC class II-containing compartments and consequently in antigen processing. IP30 can be mediated by multiple lysosomal proteases. Proteins internalized into the endocytic pathway are usually degraded. Efficient proteolysis requires denaturation, induced by acidic conditions within lysosomes, and reduction of inter- and intrachain disulfide bonds. The active site, determined by mutagenesis, consists of a pair of cysteine residues separated by two amino acids, similar to other enzymes of the thioredoxin family.
18		Receptor-like molecule	RNA binding protein.
19	52	Secretory molecule/cellular	Notch4-like protein (ZNEU1) is part of the NOTCH4 family that encodes receptors responsible for cell fate decisions during development. These Notch receptors and their ligands, Delta and Jagged, have been implicated in several diseases. When truncated, constitutively active mutant forms of the Notch receptor appear to be involved in T-cell leukemia, mammary carcinomas and a tumorous germline phenotype. Notch4 genes are expressed specifically in endothelial cells.
20	53	Secretory molecule	Novel
21	54	Secretory molecule/transporter	Serotransferrin (siderophilin) (Tf) or beta-1-metal binding globulin is part of the transferrin family. Transferrins are iron binding transport proteins which can bind two atoms of ferric iron in association with the binding of an anion, usually bicarbonate. Tf is responsible for the transport of iron from sites of absorption and heme degradation to those of storage and

			utilization. Serum transferrin also has a further role in stimulating cell proliferation. Tf gene expression is modulated by vitamin A, testosterone, and peptide hormones.
22	55	Secretory molecule/ gene or protein expression, RNA synthesis, transcription factor	Insulin-like growth factor binding protein 5 protease (IGFBP-5) modulates the effects of insulin growth factors (IGFs) on cells. IGFBP-5 is synthesized by smooth muscle cells and binds to the extracellular matrix. It is also secreted into conditioned medium of cultured cells and is cleaved into fragments by a concomitantly produced protease. These fragments have reduced affinity for the IGFs. IGFBP-5 protease belongs to a family of serine-metallo proteases.
23	56	Secretory molecule/cellular development	Major epididymis-specific protein E4 is also known as epididymal protein BE-20. It belongs to WAP-type 'four-disulfide core' family and plays a role in the maturation of spermatozoa during its movement through the epididymis and the capacity of sperm to fertilize ova. Expression of E4 was located to the epithelial cells of the cauda epididymis and proximal segment of the ductus deferens by in situ hybridization. No expression was found in sections of the corpus and caput epididymis, testis, and liver.
24		Secretory molecule/cell signaling	TNFR-related death receptor-6 DR6 contains an extracellular region containing varying numbers of cysteine-rich domains and an intracellular region that contains the death domain. Death receptors are activated in a ligand-dependent or independent manner and transduce apoptotic signals via their respective intracellular death domains.
25	57	Receptor-like molecule	Novel

26	58	Secretory molecule/regulation	Channel inducing factor precursor (CHIF) or corticosteroid-induced protein induces a potassium channel when expressed in <i>Xenopus</i> oocytes and activates endogenous oocyte transport proteins. It is a type I membrane protein selectively present in the distal parts of the nephron (medullary and papillary collecting ducts and end portions of cortical collecting tubule) and in the epithelial cells of the distal colon. No expression is found in renal proximal tubule, loop of Henle and distal tubule, proximal colon, small intestine, lung, choroid plexus, salivary glands, or brain. CHIF belongs to the ATP1G1 /PLM / Mat-8 family and exhibits significant homologies with proteins that are putatively regulatory (phospholemman, gamma-subunit of Na(+)-K(+)-ATPase, Mat-8).
27	59	Secretory molecule	Hepatocellular carcinoma-associated antigen 112.
28	60	Receptor-like molecule/homeostasis	Lymphatic endothelium-specific hyaluronan receptor LYVE-1 is a major receptor for hyaluronan (HA) on the lymph vessel wall molecule that binds both soluble and immobilized HA. LYVE-1 plays a role in the control of the HA pathway. The extracellular matrix glycosaminoglycan hyaluronan (HA) is an abundant component of skin and mesenchymal tissues where it facilitates cell migration during wound healing, inflammation, and embryonic morphogenesis. Both during normal tissue homeostasis and particularly after tissue injury, HA is mobilized from these sites through lymphatic vessels to the lymph nodes where it is degraded before entering the circulation for rapid uptake by the liver. LYVE-1 is similar to the

			CD44 HA receptor, but in contrast to CD44, LYVE-1 colocalizes with HA on the luminal face of the lymph vessel wall and is completely absent from blood vessels.
29	61	Receptor-like molecule/cell signaling	G protein-coupled receptor GPR35 is an integral membrane protein that belongs to family 1 of G-protein coupled receptors (GPCR). The GPCR family shares a structural motif of seven transmembrane segments with large numbers of conserved residues in those regions.
30	62	Receptor-like molecule	Tumor-associated glycoprotein E4 is also known as Taa1 or Tage4 and belongs to the immunoglobulin superfamily. This family contains cell adhesion molecules which have wide-ranging functions and mediate a variety of homotypic and heterotypic cellular interactions playing a general role in cell surface recognition. The Tage4 gene product is closely related to the hepatocellular carcinoma antigen TuAg.1. Tage4 is a glycoprotein expressed at the surface of colon carcinoma cell lines, but at a very low level in normal adult colon and lung tissue and not in normal tissues tested.
31	63	Secretory molecule	Hypothetical 28.6 kDa protein is also known as plunc, for palate, lung, and nasal epithelium clone. Expression of plunc is associated with the palate, nasal septum, and nasal conchae. It is also expressed strongly in the trachea and bronchi of the adult lung. No significant homologies with known genes were observed at the nucleotide level and limited amino acid homology with two salivary gland-specific proteins was noted. The amino acid sequence revealed consensus sequences for N-glycosylation, protein kinase C and

			casein kinase phosphorylation, as well as a leucine zipper. In addition, an unique amino acid sequence repeat sequence is located near the amino-terminal portion of the protein.
32	64	Secretory molecule	<p>Claudin-18 (Cldn18) is a component of tight junction (TJ) strands and belongs to the claudin family. Claudins are integral membrane protein component of tight junctions, a structure controlling cell-to-cell adhesion and, consequently, regulating paracellular and transcellular transport of solutes across epithelia and endothelia. The claudin family also includes occludin and 17 other distinct claudins. Claudin family members are tetra-span transmembrane proteins that are localized in cell-specific TJs. In multicellular organisms, various compositionally distinct fluid compartments are established by epithelial and endothelial cellular sheets. For these cells to function as barriers, TJs are considered to create a primary barrier for the diffusion of solutes through the paracellular pathway. Claudins are therefore responsible for TJ-specific obliteration of the intercellular space.</p>
33		Secretory molecule	<p>Glutamine repeat protein 1 (GRP-1) contains simple tandem repeats of the trinucleotide sequence CAG that encode homopolymeric stretches of glutamine. Although polyglutamine has been identified in diverse proteins, it is present predominantly in transcription factors. Greater than two-thirds of GRP-1 are only two amino acids, namely glutamine (50%) and histidine (18%). There are four polyglutamine motifs interspersed with histidine-rich regions. There is also a putative</p>

			<p>nuclear localization signal flanked by sites for possible serine phosphorylation. GRP-1 mRNA was expressed constitutively in some macrophage cell lines and B and T cell lines. Interferon-gamma or lipopolysaccharide augmented GRP-1 mRNA expression in the mouse macrophage cell line ANA-1. Because polyglutamine motifs can cause protein oligomerization and can function as transcriptional activation domains, GRP-1 is a transcription factor associated with interferon-gamma- or lipopolysaccharide-induced activation of macrophages.</p>
34		Secretory molecule	Alpha-1 collagen
35	65	Receptor-like molecule/Cell signaling	<p>Gdnf family receptor alpha 4, transmembrane isoform (Gfra4) is a members of the Gdnf protein family that signal through receptors consisting of a GPI-linked GFRalpha subunit and the transmembrane tyrosine kinase Ret. Gfra4 is expressed in many tissues, including nervous system, in which intron retention leads to a putative intracellular or secreted GFRalpha4 protein. Efficient splicing occurs only in thyroid, parathyroid, and pituitary and less in adrenal glands. A splice form that leads to a GPI-linked GFRalpha4 receptor is expressed in juvenile thyroid and parathyroid glands. In newborn and mature thyroid as well as in parathyroid and pituitary glands major transcripts encode for a putative transmembrane isoform of GFRalpha4. GFRalpha4 expression may restrict the inherited cancer syndrome multiple endocrine neoplasia type 2, associated with mutations in RET, to these cells.</p>

The word "polynucleotide(s)," as used herein, means a polymeric collection of nucleotides and includes DNA and corresponding RNA molecules and both single and double stranded molecules, including HnRNA and mRNA molecules, sense and anti-sense strands of DNA and RNA molecules, and comprehends cDNA, genomic DNA, and wholly or partially synthesized polynucleotides. An HnRNA molecule contains introns and "corresponds to" a DNA molecule in a generally one-to-one manner. An mRNA molecule "corresponds to" an HnRNA and DNA molecule from which the introns have been excised. A polynucleotide of the present invention may be an entire gene, or any portion thereof. A gene is a DNA sequence which codes for a functional protein or RNA molecule. Operable anti-sense polynucleotides may comprise a fragment of the corresponding polynucleotide, and the definition of "polynucleotide" therefore includes all operable anti-sense fragments. Anti-sense polynucleotides and techniques involving anti-sense polynucleotides are well known in the art and are described, for example, in Robinson-Benion *et al.*, *Methods in Enzymol.* 254(23): 363-375, 1995 and Kawasaki *et al.*, *Artific. Organs* 20 (8): 836-848, 1996.

Identification of genomic DNA and heterologous species DNA can be accomplished by standard DNA/DNA hybridization techniques, under appropriately stringent conditions, using all or part of a cDNA sequence as a probe to screen an appropriate library. Alternatively, PCR techniques using oligonucleotide primers that are designed based on known genomic DNA, cDNA and/or protein sequences can be used to amplify and identify genomic and cDNA sequences. Synthetic DNA corresponding to the identified sequences and variants may be produced by conventional synthesis methods. All of the polynucleotides described herein are isolated and purified, as those terms are commonly used in the art.

As used herein, the term "oligonucleotide" refers to a relatively short segment of a polynucleotide sequence, generally comprising between 6 and 60 nucleotides, and comprehends both probes for use in hybridization assays and primers for use in the amplification of DNA by polymerase chain reaction.

As used herein, the term "x-mer," with reference to a specific value of "x," refers to a polynucleotide comprising at least a specified number ("x") of contiguous residues of any of the polynucleotides identified as SEQ ID NOS: 1-35. The value of *x* may be from about 20 to about 600, depending upon the specific sequence.

As used herein, the term "polypeptide" encompasses amino acid chains of any length, including full-length proteins, wherein amino acid residues are linked by covalent peptide bonds. Polypeptides of the present invention may be naturally purified products, or may be produced partially or wholly using recombinant techniques. Such polypeptides may be glycosylated with mammalian or other eukaryotic carbohydrates or may be non-glycosylated.

According to one embodiment, "variants" of the polynucleotides of the present invention, including the polynucleotides set forth as SEQ ID NOS: 1-35, as that term is used herein, comprehends polynucleotides producing an "E" value of 0.01 or less, as described below, or having at least a specified percentage identity to a polynucleotide of the present invention, as described below. Polynucleotide variants of the present invention may be naturally occurring allelic variants, or non-naturally occurring variants.

Polynucleotide and polypeptide sequences may be aligned, and percentages of identical residues in a specified region may be determined against another polynucleotide or polypeptide, using computer algorithms that are publicly available. Two exemplary algorithms for aligning and identifying the similarity of polynucleotide sequences are the BLASTN and FASTA algorithms. Polynucleotides may also be analyzed using the BLASTX algorithm, which compares the six-frame conceptual translation products of a nucleotide query sequence (both strands) against a protein sequence database. The percentage identity of polypeptide sequences may be examined using the BLASTP algorithm. The BLASTN, BLASTP and BLASTX algorithms are available on the NCBI anonymous FTP server (<ftp://ncbi.nlm.nih.gov>) under /blast/executables/ and are available from the National Center for Biotechnology Information (NCBI), National Library of Medicine, Building 38A, Room 8N805, Bethesda, MD 20894,

USA. The BLASTN algorithm Version 2.0.11 [Jan-20-2000], set to the parameters described below, is preferred for use in the determination of polynucleotide variants according to the present invention. The BLASTP algorithm, set to the parameters described below, is preferred for use in the determination of polypeptide variants according to the present invention. The use of the BLAST family of algorithms, including BLASTN, BLASTP and BLASTX, is described at NCBI's website at URL <http://www.ncbi.nlm.nih.gov/BLAST/newblast.html> and in the publication of Altschul, *et al.*, *Nucleic Acids Res.* 25: 3389-3402, 1997.

- 10 The FASTA and FASTX algorithms are available on the Internet at the ftp site <ftp://ftp.virginia.edu/pub/>, and from the University of Virginia by contacting David Hudson, Vice Provost for Research, University of Virginia, P.O. Box 9025, Charlottesville, VA 22906-9025, USA. The FASTA algorithm, set to the default parameters described in the documentation and distributed with the algorithm, may be used in the determination of polynucleotide variants. The readme files for FASTA and FASTX Version 1.0x that are distributed with the algorithms describe the use of the algorithms and describe the default parameters. The use of the FASTA and FASTX algorithms is described in Pearson and Lipman, *Proc. Natl. Acad. Sci. USA* 85:2444-2448, 1988; and Pearson, *Methods in Enzymol.* 183:63-98, 1990. The following running parameters are preferred for determination of alignments and similarities using BLASTN that contribute to the E values and percentage identity: Unix running command with default parameter values thus: `blastall -p blastn -d embldb -e 10 -G 0 -E 0 -r 1 -v 30 -b 30 -i queryseq -o results`; the Parameters are : -p Program Name [String]; -d Database [String]; -e Expectation value (E) [Real]; -G Cost to open a gap (zero invokes default behavior) [Integer]; -E Cost to extend a gap (zero invokes default behavior) [Integer]; -r Reward for a nucleotide match (BLASTN only) [Integer]; -v Number of one-line descriptions (V) [Integer]; -b Number of alignments to show (B) [Integer]; -i Query File [File In]; -o BLAST report Output File [File Out] Optional.
- 25
- 30

The "hits" to one or more database sequences by a queried sequence produced by BLASTN or FASTA or a similar algorithm align and identify similar portions of sequences. The hits are arranged in order of the degree of similarity and the length of sequence overlap. Hits to a database sequence generally
5 represent an overlap over only a fraction of the sequence length of the queried sequence.

The BLASTN and FASTA algorithms produce "Expect" values for alignments. The Expect value (E) indicates the number of hits one can "expect" to see over a certain number of contiguous sequences by chance when searching a
10 database of a certain size. The Expect value is used as a significance threshold for determining whether the hit to a database, such as the preferred EMBL database, indicates true similarity. For example, an E value of 0.1 assigned to a hit is interpreted as meaning that in a database of the size of the EMBL database, one might expect to see 0.1 matches over the aligned portion of the sequence with a
15 similar score simply by chance. The aligned and matched portions of the sequences, then, have a probability of 90% of being the same by this criterion. For sequences having an E value of 0.01 or less over aligned and matched portions, the probability of finding a match by chance in the EMBL database is 1% or less using the BLASTN or FASTA algorithm.

20 According to one embodiment, "variant" polynucleotides, with reference to each of the polynucleotides of the present invention, preferably comprise sequences having the same number or fewer nucleic acids than each of the polynucleotides of the present invention and producing an E value of 0.01 or less when compared to the polynucleotide of the present invention. That is, a variant
25 polynucleotide is any sequence that has at least a 99% probability of being the same as the polynucleotide of the present invention, measured as having an E value of 0.01 or less using the BLASTN or FASTA algorithms set at the default parameters. According to a preferred embodiment, a variant polynucleotide is a sequence having the same number or fewer nucleic acids than a polynucleotide of
30 the present invention that has at least a 99% probability of being the same as the

polynucleotide of the present invention, measured as having an E value of 0.01 or less using the BLASTN or FASTA algorithms set at the default parameters.

Alternatively, variant polynucleotides of the present invention may comprise a sequence exhibiting at least about 40%, more preferably at least about 5 60%, more preferably yet at least about 75%, and most preferably at least about 90% similarity to a polynucleotide of the present invention, determined as described below. The percentage similarity is determined by aligning sequences using one of the BLASTN or FASTA algorithms, set at default parameters, and identifying the number of identical nucleic acids over the best aligned portion; 10 dividing the number of identical nucleic acids by the total number of nucleic acids of the polynucleotide of the present invention; and then multiplying by 100 to determine the percentage similarity. For example, a polynucleotide of the present invention having 220 nucleic acids has a hit to a polynucleotide sequence in the EMBL database having 520 nucleic acids over a stretch of 23 nucleotides in the 15 alignment produced by the BLASTN algorithm using the default parameters. The 23 nucleotide hit includes 21 identical nucleotides, one gap and one different nucleotide. The percentage similarity of the polynucleotide of the present invention to the hit in the EMBL library is thus 21/220 times 100, or 9.5%. The polynucleotide sequence in the EMBL database is thus not a variant of a 20 polynucleotide of the present invention.

Alternatively, variant polynucleotides of the present invention hybridize to a polynucleotide of the present invention under stringent hybridization conditions. As used herein, "stringent conditions" mean prewashing in a solution of 6X SSC, 0.2% SDS; hybridizing at 65°C, 6X SSC, 0.2% SDS overnight; followed by two 25 washes of 30 minutes each in 1X SSC, 0.1% SDS at 65°C and two washes of 30 minutes each in 0.2X SSC, 0.1% SDS at 65°C.

The present invention also encompasses allelic variants of the disclosed sequences, together with DNA sequences that differ from the disclosed sequences but which, due to the degeneracy of the genetic code, encode a polypeptide which 30 is the same as that encoded by a DNA sequence disclosed herein. Thus, polynucleotides comprising sequences that differ from the polynucleotide

sequences recited in SEQ ID NOS: 1-35, or complements, reverse sequences, or reverse complements of those sequences as a result of conservative substitutions are contemplated by and encompassed within the present invention. Additionally, polynucleotides comprising sequences that differ from the polynucleotide sequences recited in SEQ ID NOS: 1-35, or complements, reverse complements, or reverse sequences as a result of deletions and/or insertions totaling less than 10% of the total sequence length are also contemplated by and encompassed within the present invention.

The polynucleotides of the present invention may be isolated from various DNA libraries, or may be synthesized using techniques that are well known in the art. The polynucleotides may be synthesized, for example, using automated oligonucleotide synthesizers (e.g. Beckman Oligo 1000M DNA Synthesizer) to obtain polynucleotide segments of up to 50 or more nucleic acids. A plurality of such polynucleotide segments may then be ligated using standard DNA manipulation techniques that are well known in the art of molecular biology. One conventional and exemplary polynucleotide synthesis technique involves synthesis of a single stranded polynucleotide segment having, for example, 80 nucleic acids, and hybridizing that segment to a synthesized complementary 85 nucleic acid segment to produce a 5-nucleotide overhang. The next segment may then be synthesized in a similar fashion, with a 5-nucleotide overhang on the opposite strand. The "sticky" ends ensure proper ligation when the two portions are hybridized. In this way, a complete polynucleotide of the present invention may be synthesized entirely *in vitro*.

SEQ ID NOS: 2, 3, 5, 7-9, 11, 12, 14, 15, 17, 19-21, 23, 26, 28 and 30-32 are full-length sequences. The remaining polynucleotides are referred to as "partial" sequences, in that they may not represent the full coding portion of a gene encoding a naturally occurring polypeptide. The partial polynucleotide sequences disclosed herein may be employed to obtain the corresponding full-length genes for various species and organisms by, for example, screening DNA expression libraries using hybridization probes based on the polynucleotides of the present invention, or using PCR amplification with primers based upon the

polynucleotides of the present invention. In this way one can, using methods well known in the art, extend a polynucleotide of the present invention upstream and downstream of the corresponding mRNA, as well as identify the corresponding genomic DNA, including the promoter and enhancer regions, of the complete
5 gene. The present invention thus comprehends isolated polynucleotides comprising a sequence identified in SEQ ID NOS: 1-35, or a variant of one of the specified sequences, that encode a functional polypeptide, including full-length genes. Such extended polynucleotides may have a length of from about 50 to about 4,000 nucleic acids or base pairs, and preferably have a length of less than
10 about 4,000 nucleic acids or base pairs, more preferably yet a length of less than about 3,000 nucleic acids or base pairs, more preferably yet a length of less than about 2,000 nucleic acids or base pairs. Under some circumstances, extended polynucleotides of the present invention may have a length of less than about 1,800 nucleic acids or base pairs, preferably less than about 1,600 nucleic acids or
15 base pairs, more preferably less than about 1,400 nucleic acids or base pairs, more preferably yet less than about 1,200 nucleic acids or base pairs, and most preferably less than about 1,000 nucleic acids or base pairs.

Polynucleotides of the present invention comprehend polynucleotides comprising at least a specified number of contiguous residues (x -mers) of any of
20 the polynucleotides identified as SEQ ID NOS: 1-35 or their variants. According to preferred embodiments, the value of x is preferably at least 20, more preferably at least 40, more preferably yet at least 60, and most preferably at least 80. Thus, polynucleotides of the present invention include polynucleotides comprising a 20-mer, a 40-mer, a 60-mer, an 80-mer, a 100-mer, a 120-mer, a 150-mer, a 180-mer,
25 a 220-mer a 250-mer, or a 300-mer, 400-mer, 500-mer or 600-mer of a polynucleotide identified as SEQ ID NOS: 1-35 or a variant of one of the polynucleotides identified as SEQ ID NOS: 1-35.

Polynucleotide probes and primers complementary to and/or
corresponding to SEQ ID NOS: 1-35, and variants of those sequences, are also
30 comprehended by the present invention. Such oligonucleotide probes and primers are substantially complementary to the polynucleotide of interest. An

oligonucleotide probe or primer is described as "corresponding to" a polynucleotide of the present invention, including one of the sequences set out as SEQ ID NOS: 1-35 or a variant, if the oligonucleotide probe or primer, or its complement, is contained within one of the sequences set out as SEQ ID NOS: 1-35 or a variant of one of the specified sequences.

Two single stranded sequences are said to be substantially complementary when the nucleotides of one strand, optimally aligned and compared using, for example, the BLAST algorithm as described above, with the appropriate nucleotide insertions and/or deletions, pair with at least 80%, preferably at least 90% to 95%, and more preferably at least 98% to 100%, of the nucleotides of the other strand. Alternatively, substantial complementarity exists when a first DNA strand will selectively hybridize to a second DNA strand under stringent hybridization conditions. Stringent hybridization conditions for determining complementarity include salt conditions of less than about 1 M, more usually less than about 500 mM and preferably less than about 200 mM. Hybridization temperatures can be as low as 5°C, but are generally greater than about 22°C, more preferably greater than about 30°C and most preferably greater than about 37°C. Longer DNA fragments may require higher hybridization temperatures for specific hybridization. Since the stringency of hybridization may be affected by other factors such as probe composition, presence of organic solvents and extent of base mismatching, the combination of parameters is more important than the absolute measure of any one alone. The DNA from plants or samples or products containing plant material can be either genomic DNA or DNA derived by preparing cDNA from the RNA present in the sample.

In addition to DNA-DNA hybridization, DNA-RNA or RNA-RNA hybridization assays are also possible. In the case of DNA-RNA hybridization, the mRNA from expressed genes would then be detected instead of genomic DNA or cDNA derived from mRNA of the sample. In the case of RNA-RNA hybridization, RNA probes could be used. In addition, artificial analogs of DNA hybridizing specifically to target sequences could also be employed.

In specific embodiments, the oligonucleotide probes and/or primers comprise at least about 6 contiguous residues, more preferably at least about 10 contiguous residues, and most preferably at least about 20 contiguous residues complementary to a polynucleotide sequence of the present invention. Probes and
5 primers of the present invention may be from about 8 to 100 base pairs in length or, preferably from about 10 to 50 base pairs in length or, more preferably from about 15 to 40 base pairs in length. The probes can be easily selected using procedures well known in the art, taking into account DNA-DNA hybridization stringencies, annealing and melting temperatures, potential for formation of loops
10 and other factors, which are well known in the art. Tools and software suitable for designing probes, and especially suitable for designing PCR primers, are available on the Internet, for example, URL <http://www.horizonpress.com/pcr/>. Preferred techniques for designing PCR primers are also disclosed in Dieffenbach and Dykster, *PCR primer: a laboratory manual*. Cold Spring Harbor Laboratory
15 Press, Cold Spring Harbor, NY, 1995.

A plurality of oligonucleotide probes or primers corresponding to a polynucleotide of the present invention may be provided in a kit form. Such kits generally comprise multiple DNA or oligonucleotide probes, each probe being specific for a polynucleotide sequence. Kits of the present invention may
20 comprise one or more probes or primers corresponding to a polynucleotide of the present invention, including a polynucleotide sequence identified in SEQ ID NOS: 1-35.

In one embodiment useful for high-throughput assays, the oligonucleotide probe kits of the present invention comprise multiple probes in an array format,
25 wherein each probe is immobilized in a predefined, spatially addressable location on the surface of a solid substrate. Array formats which may be usefully employed in the present invention are disclosed, for example, in U.S. Patents No. 5,412,087, 5,545,531, and PCT Publication No. WO 95/00530, the disclosures of which are hereby incorporated by reference.

30 Oligonucleotide probes for use in the present invention may be constructed synthetically prior to immobilization on an array, using techniques well known in

the art (see, for example, *Oligonucleotide Synthesis: A Practical Approach*, Gait, ed., IRL Press, Oxford, 1984). Automated equipment for the synthesis of oligonucleotides is available commercially from such companies as Perkin Elmer/Applied Biosystems Division (Foster City, CA) and may be operated
5 according to the manufacturer's instructions. Alternatively, the probes may be constructed directly on the surface of the array using techniques taught, for example, in PCT Publication No. WO 95/00530.

The solid substrate and the surface thereof preferably form a rigid support and are generally formed from the same material. Examples of materials from
10 which the solid substrate may be constructed include polymers, plastics, resins, membranes, polysaccharides, silica or silica-based materials, carbon, metals and inorganic glasses. Synthetically prepared probes may be immobilized on the surface of the solid substrate using techniques well known in the art, such as those disclosed in U.S. Patent No. 5,412,087.

15 In one such technique, compounds having protected functional groups, such as thiols protected with photochemically removable protecting groups, are attached to the surface of the substrate. Selected regions of the surface are then irradiated with a light source, preferably a laser, to provide reactive thiol groups. This irradiation step is generally performed using a mask having apertures at
20 predefined locations using photolithographic techniques well known in the art of semiconductors. The reactive thiol groups are then incubated with the oligonucleotide probe to be immobilized. The precise conditions for incubation, such as temperature, time and pH, depend on the specific probe and can be easily determined by one of skill in the art. The surface of the substrate is washed free of
25 unbound probe and the irradiation step is repeated using a second mask having a different pattern of apertures. The surface is subsequently incubated with a second, different, probe. Each oligonucleotide probe is typically immobilized in a discrete area of less than about 1 mm². Preferably each discrete area is less than about 10,000 mm², more preferably less than about 100 mm². In this manner, a
30 multitude of oligonucleotide probes may be immobilized at predefined locations on the array.

The resulting array may be employed to screen for differences in organisms or samples or products containing genetic material as follows. Genomic or cDNA libraries are prepared using techniques well known in the art. The resulting target DNA is then labeled with a suitable marker, such as a radiolabel, chromophore, fluorophore or chemiluminescent agent, using protocols well known for those skilled in the art. A solution of the labeled target DNA is contacted with the surface of the array and incubated for a suitable period of time.

The surface of the array is then washed free of unbound target DNA and the probes to which the target DNA hybridized are determined by identifying those regions of the array to which the markers are attached. When the marker is a radiolabel, such as ^{32}P , autoradiography is employed as the detection method. In one embodiment, the marker is a fluorophore, such as fluorescein, and the location of bound target DNA is determined by means of fluorescence spectroscopy. Automated equipment for use in fluorescence scanning of oligonucleotide probe arrays is available from Affymetrix, Inc. (Santa Clara, CA) and may be operated according to the manufacturer's instructions. Such equipment may be employed to determine the intensity of fluorescence at each predefined location on the array, thereby providing a measure of the amount of target DNA bound at each location. Such an assay would be able to indicate not only the absence and presence of the marker probe in the target, but also the quantitative amount as well.

In this manner, oligonucleotide probe kits of the present invention may be employed to examine the presence/absence (or relative amounts in case of mixtures) of polynucleotides in different samples or products containing different materials rapidly and in a cost-effective manner.

Another aspect of the present invention involves collections of a plurality of polynucleotides of the present invention. A collection of a plurality of the polynucleotides of the present invention, particularly the polynucleotides identified as SEQ ID NOS: 1-35, may be recorded and/or stored on a storage medium and subsequently accessed for purposes of analysis, comparison, etc. One utility for such sets of sequences is the analysis of the set, either alone or together with other sequences sets, for single nucleotide polymorphisms (SNPs)

between sequences from different tissues and/or individuals for genetic studies, mapping and fingerprinting purposes. Suitable storage media include magnetic media such as magnetic diskettes, magnetic tapes, CD-ROM storage media, optical storage media, and the like. Suitable storage media and methods for
5 recording and storing information, as well as accessing information such as polynucleotide sequences recorded on such media, are well known in the art. The polynucleotide information stored on the storage medium is preferably computer-readable and may be used for analysis and comparison of the polynucleotide information.

10 Another aspect of the present invention thus involves storage medium on which are recorded a collection of the polynucleotides of the present invention, particularly a collection of the polynucleotides identified as SEQ ID NOS: 1-35. According to one embodiment, the storage medium includes a collection of at least 20, preferably at least 50, more preferably at least 100, and most preferably
15 at least 200 of the polynucleotides of the present invention, preferably the polynucleotides identified as SEQ ID NOS: 1-35, or variants of those polynucleotides.

Another aspect of the present invention involves a combination of polynucleotides, the combination containing at least 5, preferably at least 10, more
20 preferably at least 20, and most preferably at least 50 different polynucleotides of the present invention, including polynucleotides selected from SEQ ID NOS: 1-35, or variants of these polynucleotides.

In another aspect, the present invention provides DNA constructs comprising, in the 5'-3' direction, a gene promoter sequence; an open reading
25 frame coding for at least a functional portion of a polypeptide encoded by a polynucleotide of the present invention; and a gene termination sequence. The open reading frame may be orientated in either a sense or antisense direction. DNA constructs comprising a non-coding region of a gene coding for an enzyme encoded by the above DNA sequences or a nucleotide sequence complementary to
30 a non-coding region, together with a gene promoter sequence and a gene termination sequence, are also provided. Preferably, the gene promoter and

termination sequences are functional in a host cell. More preferably, the gene promoter and termination sequences are common to those of the polynucleotide being introduced. Other promoter and termination sequences generally used in the art, such as the Cauliflower Mosaic Virus (CMV) promoter, with or without enhancers, such as the Kozak sequence or Omega enhancer, and *Agrobacterium tumefaciens* nopal synthase terminator may be usefully employed in the present invention. Tissue-specific promoters may be employed in order to target expression to one or more desired tissues. The DNA construct may further include a marker for the identification of transformed cells.

10 Techniques for operatively linking the components of the DNA constructs are well known in the art and include the use of synthetic linkers containing one or more restriction endonuclease sites as described, for example, by Sambrook *et al.*, *Molecular Cloning: a laboratory manual*, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1989. The DNA constructs of the present invention
15 may be linked to a vector having at least one replication system, for example, *Escherichia coli*, whereby after each manipulation, the resulting construct can be cloned and sequenced and the correctness of the manipulation determined.

Transgenic cells comprising the DNA constructs of the present invention are provided, together with organisms comprising such transgenic cells.
20 Techniques for stably incorporating DNA constructs into the genome of target organisms, such as mammals, are well known in the art and include electroporation, protoplast fusion, injection into reproductive organs, injection into immature embryos, high velocity projectile introduction and the like. The choice of technique will depend upon the target organism to be transformed. In
25 one embodiment, naked DNA is injected or delivered orally. Once the cells are transformed, cells having the DNA construct incorporated in their genome are selected. Transgenic cells may then be cultured in an appropriate medium, using techniques well known in the art.

In yet a further aspect, the present invention provides methods for
30 modifying the level (concentration) or activity of a polypeptide in a host organism, comprising stably incorporating into the genome of the organism a

DNA construct of the present invention. The DNA constructs of the present invention may be used to transform a variety of organisms, including mammals, for example to make experimental gene knock out or transgenic animals.

Further, the polynucleotides of the present invention have particular
5 application for use as non-disruptive tags for marking organisms, including commercially valuable animals, fish, bacteria and yeasts. DNA constructs comprising polynucleotides of the present invention may be stably introduced into an organism as heterologous, non-functional, non-disruptive tags. It is then possible to identify the origin or source of the organism at a later date by
10 determining the presence or absence of the tag(s) in a sample of material.

Detection of the tag(s) may be accomplished using a variety of conventional techniques, and will generally involve the use of nucleic acid probes. Sensitivity in assaying the presence of probe can be usefully increased by using branched oligonucleotides, as described by Horn *et al.*, *Nucleic Acids Res.*
15 25(23):4842-4849, 1997, enabling to detect as few as 50 DNA molecules in the sample.

In particular, the polynucleotides of the present invention encode polypeptides that have important roles in processes such as induction of growth, differentiation of tissue-specific cells, cell migration, cell proliferation, and cell-
20 cell interaction. These polypeptides are important in the maintenance of tissue integrity, and thus are important in processes such as wound healing. Some of these polypeptides act as modulators of immune responses, such as immunologically active polypeptides for the benefit of offspring. In addition, many polypeptides are immunologically active, making them important
25 therapeutic targets in a whole range of disease states. Antibodies to the polypeptides of the present invention and small molecule inhibitors related to the polypeptides of the present invention may also be used for modulating immune responses and for treatment of diseases according to the present invention.

SEQ ID NOS: 1; 2; 4; 5; 6; 8; 9; 11; 12; 14; 17; 19-24; 26; 27; 31-34
30 encode secreted polypeptides. SEQ ID NOS: 10; 15; 16; 18; 25; 28; 30; and 35 encode polypeptides acting as receptors. SEQ ID NOS: 2; 4; 24; 29 and 35

encode polypeptides with cell signaling activity, which may be either intracellular or extracellular. Kinase genes, for example, encode polypeptides that phosphorylate specific substrates during cell-to-cell signaling. While some kinases are involved in normal metabolism and nucleotide production, others are significant for altering the activity of many cellular processes through the phosphorylation of specific proteins. Polypeptides encoded by these genes are important in the transmission of intracellular signals resulting from the binding of extracellular ligands such as hormones, growth factors or cytokines to membrane-bound receptors. The utility of polynucleotides encoding kinases resides in the manipulation of their signaling activities and downstream effects for the diagnosis and treatment of mammalian diseases that may be a consequence of inappropriate expression of these kinase genes.

SEQ ID NOS: 2 and 4 encode polypeptides with cytokine activity. Cytokine or growth factor polynucleotides encode polypeptides involved in intercellular signaling and represent another important class of molecules. Polynucleotides encoding such genes have utility in the diagnosis and treatment of disease.

SEQ ID NOS: 7; 11; 12; 15 and 22 encode polypeptides with transcription factor activity. These polynucleotides encode polypeptides required for the control of synthesis of proteins in tissue specific manner and have utility for the modification of protein synthesis for the control of disease.

SEQ ID NOS: 8 encode polypeptides acting in the extracellular matrix.

SEQ ID NOS: 11; 12; 15 and 22 encode polypeptides with RNA synthesis activities.

SEQ ID NO: 12 encodes a polypeptide having CD antigen activity. Such polynucleotides have utility as modulators of the composition, expression level and class of CD antigen expressed, which influence immune responses to self-antigens, neo-antigens and infectious agents.

Further exemplary specific utilities, for exemplary polynucleotides of the present invention, are specified in the Table below.

SEQ ID NO:	UTILITY
2	Promoting immune response as part of a vaccine or anti-cancer treatment. Inhibitors of this molecule can be useful as anti-inflammatory treatment, e.g. for autoimmune diseases or allergies.
11; 19	Utility as a target for cancer treatment and as an immunoregulatory and anti-inflammatory molecule
12	Diagnostic for specific types of cancer and for development of an anti-cancer treatment.
15	As a target for antagonists in the treatment of diseases such as asthma and allergy.
22	Useful to inhibit or enhance the activity of the soluble molecule that binds this protein.
28	Useful to promote or block cell trafficking and therefore in the treatment as anti-inflammatory and/or vaccine adjuvant where it can promoter inflammation.
35	Useful for tissue and neural regeneration.

The following examples are offered by way of illustration and not by way of limitation.

5

Example 1

ISOLATION OF CDNA SEQUENCES FROM MAMMALIAN EXPRESSION LIBRARIES

The cDNA sequences of the present invention were obtained by high-throughput sequencing of cDNA expression libraries constructed mouse airways-induced eosinophilia, rat dermal papilla and mouse stromal cells. The cDNA
10 libraries were prepared as follows.

cDNA Library from Dermal Papilla (DEPA)

Dermal papilla cells from rat hair vibrissae (whiskers) were grown in
15 culture and the total RNA extracted from these cells using established protocols. Total RNA, isolated using TRIzol Reagent (BRL Life Technologies, Gaithersburg, MD), was used to obtain mRNA using a Poly(A) Quik mRNA isolation kit (Stratagene, La Jolla, CA), according to the manufacturer's

specifications. A cDNA expression library was then prepared from the mRNA by reverse transcriptase synthesis using a Lambda ZAP cDNA library synthesis kit (Stratagene).

5 *cDNA library from mouse airway-induced eosinophilia (MALA)*

Airway eosinophilia were induced in BALB/cByJ mice by administering 2 µg ovalbumin in 2 mg alum adjuvant intraperitoneally on day 0 and day 14, and subsequently 100 µg ovalbumin in 50 µl phosphate buffered saline (PBS) intranasally route on day 28. The accumulated eosinophils in the lungs were
10 detected by washing the airways of the anesthetized mice with saline, collecting the washings (broncheolar lavage or BAL), and counting the numbers of eosinophils. The mice were sacrificed and total RNA was isolated from whole lung tissue using TRIzol Reagent (BRL Life Technologies). mRNA was isolated by using a Poly(A) Quik mRNA isolation kit (Stratagene, La Jolla, CA),
15 according to the manufacturer's specifications. A cDNA expression library was then prepared from the mRNA by reverse transcriptase synthesis using a Lambda ZAP cDNA library synthesis kit (Stratagene).

cDNA Expression Library from Peripheral Lymph Node Stromal Cells (MLSA)

20 The peripheral axillary and brachial lymph nodes of BALB/cByJ mice with the flaky skin (*fsn*) mutation (Jackson Laboratories, Bar Harbour, MN) were dissected out. Single cell suspensions were obtained from the lymph nodes and cultured in tissue culture flasks at 10^7 cells /ml in 20% fetal calf serum and Dulbecco's Minimum Essential Medium. After 2 days the non-adherent cells were
25 removed. The adherent cells were cultured for a further 2 days and then treated with 0.25 g/100ml Trypsin (ICN, Aurora, OH) and re-cultured. After a further 4 days, non-adherent cells were discarded and adherent cells removed by trypsinization. Remaining adherent cells were physically removed by scraping with a rubber policeman. All adherent stromal cells were pooled.

cDNA Expression Library from Flaky skin lymph node stromal cells in pBK-CMV (MLSA)

Stromal cells from Flaky skin mice lymph nodes were grown in culture and the total RNA extracted from these cells using established protocols. Total
5 RNA, isolated using TRIzol Reagent (BRL Life Technologies, Gaithersburg, MD), was used to obtain mRNA using a Poly(A) Quik mRNA isolation kit (Stratagene, La Jolla, CA), according to the manufacturer's specifications. A cDNA expression library was then prepared from the mRNA by reverse transcriptase synthesis using a Lambda ZAP cDNA library synthesis kit
10 (Stratagene).

cDNA sequences were obtained by high-throughput sequencing of the cDNA libraries described above using a Prism 377 sequencer (Perkin Elmer/Applied Biosystems Division, Foster City CA), and are provided in SEQ ID NO: 1-35, with corresponding polypeptide sequences in SEQ ID NOS: 36-65.

15

EXAMPLE 2

Analysis of cDNA sequences using BLAST algorithms

BLASTN Polynucleotide analysis

20 The isolated cDNA sequences were compared to sequences in the EMBL DNA database using the computer algorithm BLASTN. Comparisons of DNA sequences provided in SEQ ID NOS: 1-35, to sequences in the EMBL DNA database (using BLASTN) were made as of November, 2000, using Version 2.0.11 [Jan-20-2000], and the following Unix running command: blastall -p
25 blastn -d embldb -e 10 -G0 -E0 -r 1 -v 30 -b 30 -i queryseq -o.

The sequences of SEQ ID NOS: 1, 3, 4, 6-11, 13, 18, 21, 22, 24, 25, 28-30, 33 and 34 were determined to have less than 50% identity, determined as described above, to sequences in the EMBL database using the computer algorithm BLASTN, as described above. The sequences of SEQ ID NOS: 2, 12,
30 14-16, 20 and 35 were determined to have less than 75% identity, determined as described above, to sequences in the EMBL database using the computer

algorithm BLASTN, as described above. The sequences of SEQ ID NOS: 17, 19, 23 and 27 were determined to have less than 90% identity, determined as described above, to sequences in the EMBL database using the computer algorithm BLASTN, as described above. Finally, the sequences of SEQ ID NOS: 5, 26 and 32 were determined to have less than 98% identity, determined as described above, to sequences in the EMBL database using the computer algorithm BLASTN, as described above.

BLASTP Polypeptide analysis

The sequences of SEQ ID NOS: 37, 41, 42, 44, 46-50, 55, 56 and 59 were determined to have less than 50% identity, determined as described above, to sequences in the SwissProt database using the computer algorithm BLASTP, as described above. The sequences of SEQ ID NOS: 36, 38, 43, 45 and 60 were determined to have less than 75% identity, determined as described above, to sequences in the SwissProt database using the computer algorithm BLASTP, as described above. The sequences of SEQ ID NOS: 39, 54 and 58 were determined to have less than 90% identity, determined as described above, to sequences in the SwissProt database using the computer algorithm BLASTP, as described above. Finally, the sequences of SEQ ID NOS: 53, 57, 62 and 65 were determined to have less than 98% identity, determined as described above, to sequences in the SwissProt database using the computer algorithm BLASTP, as described above.

BLASTX Polynucleotide Analysis

The sequences of SEQ ID NOS: 2-4, 6-16, 18, 22-24, 26-30 and 33-35 were determined to have less than 50% identity, determined as described above, to sequences in the SwissProt database using the computer algorithm BLASTX, as described above. The sequences of SEQ ID NOS: 1, 19, 20, 25 and 32 were determined to have less than 75% identity, determined as described above, to sequences in the SwissProt database using the computer algorithm BLASTX, as described above. Finally, the sequences of SEQ ID NOS: 5, 17, 21 and 31 were determined to have less than 90% identity, determined as described above, to

sequences in the SwissProt database using the computer algorithm BLASTX, as described above.

5

Example 2

ISOLATION AND CHARACTERIZATION OF THE HUMAN HOMOLOG OF muKS1

This example demonstrates that an isolated cDNA may be used to isolate its homologue from a different species, the corresponding polypeptide may be expressed and the function of the polypeptide can be determined, starting the whole process from an isolated cDNA obtained as described above.

Analysis of RNA transcripts by Northern Blotting

Northern analysis to determine the size and distribution of mRNA for the clone muKS1 (SEQ ID NO: 66; isolated from a mouse keratinocyte stem cell cDNA library using high-throughput sequencing as described above) was performed by probing murine tissue mRNA blots with a probe consisting of nucleotides 268-499 of muKS1, radioactively labeled with [α^{32} P]-dCTP. Prehybridization, hybridization, washing and probe labeling were performed as described in Sambrook *et al.*, *Ibid.* mRNA for muKS1 was 1.6 kb in size and was observed to be most abundant in brain, lung, muscle and heart. Expression could also be detected in lower intestine, skin and kidney. No detectable signal was found in testis, spleen, liver, thymus and stomach.

25 *Human homologue of muKS1*

MuKS1 (SEQ ID NO: 66) was used to search the EMBL database (Release 50 plus updates to June, 1998) to identify human EST homologues. The top three homologies were to the following ESTs: accession numbers AA643952, HS1301003 and AA865643. These showed 92.63% identity over 285 nucleotides, 93.64% over 283 nucleotides and 94.035% over 285 nucleotides, respectively. Frame shifts were identified in AA643952 and HS1301003 when

translated. Combination of all three ESTs identified the human homologue huKS1 (SEQ ID NO: 67) and translated polypeptide SEQ ID NO: 67. Alignment of muKS1 and huKS1 polypeptides indicated 95% identity over 96 amino acids.

5 *Bacterial expression and purification of muKS1 and huKS1*

Polynucleotides 269-502 of muKS1 (SEQ ID NO: 69), encoding amino acids 23-99 of polypeptide muKS1 (SEQ ID NO: 70), and polynucleotides 55-288 of huKS1 (SEQ ID NO: 71), encoding amino acids 19-95 of polypeptide huKS1 (SEQ ID NO: 72), were cloned into the bacterial expression vector pET-16b
10 (Novagen, Madison, WI), which contains a bacterial leader sequence and N-terminal 6xHistidine tag. These constructs were transformed into competent *E. coli* BL21(DE3) (Novagen) as described in Sambrook *et al.*, *Ibid.*

Starter cultures of recombinant *E. coli* BL21(DE3) (Novagen) transformed with bacterial expression vector pET16b containing SEQ ID NO: 69 (muKS1a) and SEQ ID NO: 71 (huKS1a) were grown in NZY broth containing 100 µg/ml
15 ampicillin (Gibco-BRL Life Technologies) at 37°C. Cultures were spun down and used to inoculate 800 ml of NZY broth and 100 µg/ml ampicillin. Cultures were grown until the OD₅₉₅ of the cells was between 0.4 and 0.8. Bacterial expression was induced for 3 hours with 1 mM IPTG. Bacterial expression produced an
20 induced band of approximately 15 kDa for muKS1a and huKS1a.

MuKS1a and huKS1a were expressed in insoluble inclusion bodies. In order to purify the polypeptides, bacterial cell pellets were re-suspended in lysis buffer (20 mM Tris-HCl pH 8.0, 10 mM β-Mercaptoethanol, 1 mM PMSF). To the lysed cells, 1% NP-40 was added and the mix incubated on ice for 10 minutes.
25 Lysates were further disrupted by sonication on ice at 95 W for 4 x 15 seconds and then centrifuged for 10 minutes at 18,000 rpm to pellet the inclusion bodies.

The pellet containing the inclusion bodies was re-suspended in lysis buffer containing 0.5% w/v CHAPS and sonicated for 5-10 seconds. This mix was stored on ice for 1 hour, centrifuged at 14,000 rpm for 15 minutes at 4°C and the
30 supernatant discarded. The pellet was once more re-suspended in lysis buffer

containing 0.5% w/v CHAPS, sonicated, centrifuged and the supernatant removed as before. The pellet was re-suspended in solubilizing buffer (6 M guanidine HCl, 0.5 M NaCl, 20 mM Tris-HCl pH 8.0), sonicated at 95 W for 4 x 15 sec and centrifuged for 10 minutes at 18,000 rpm and 4°C to remove debris. The
5 supernatant was stored at 4°C. MuKS1a and huKS1a were purified by virtue of the N-terminal 6x histidine tag contained within the bacterial leader sequence, using a Nickel-Chelating sepharose column (Amersham Pharmacia, Uppsala, Sweden) and following the manufacturer's protocol. Proteins were purified twice over the column to reduce endotoxin contamination. In order to re-fold the
10 proteins once purified, the protein solution was dialysed in a 4 M-2 M urea gradient in 20 mM Tris-HCl pH 7.5 containing 10% glycerol overnight at 4°C. The protein was then further dialysed 2x against 2 litres of 20 mM Tris-HCl pH 7.5 containing 10% glycerol.

15 *Injection of bacterially expressed muKS1a into nude mice*

Two nude mice were anaesthetised intraperitoneally with 75 µl of 1/10 dilution of Hypnorm (Janssen Pharmaceuticals, Buckinghamshire, England) in phosphate buffered saline. 20 µg of bacterially expressed muKS1a (SEQ ID NO:
20 70) was injected subcutaneously in the left hind foot, ear and left hand side of the back. The same volume of phosphate buffered saline was injected in the same sites but on the right hand side of the same animal. Mice were left for 18 hours and then examined for inflammation. Both mice showed a red swelling in the ear and foot sites injected with the bacterially expressed protein. No obvious
25 inflammation could be identified in either back site. Mice were culled and biopsies taken from the ear, back and foot sites and fixed in 3.7% formol saline. Biopsies were embedded, sectioned and stained with Haemotoxylin and eosin. Sites injected with muKS1a had a marked increase in polymorphonuclear granulocytes, whereas sites injected with phosphate buffered saline had a low
30 background infiltrate of polymorphonuclear granulocytes.

Chemokines are a large superfamily of highly basic secreted proteins with a broad number of functions (Baggiolini *et al.*, *Annu. Rev. Immunol.* 15:675-705, 1997; Ward *et al.*, *Immunity* 9:1-11, 1998; Horuk, *Nature* 393:524-525, 1998). The polypeptide sequences of muKS1 and huKS1 have similarity to CXC chemokines, suggesting that this protein will act like other CXC chemokines. The *in vivo* data from nude mice supports this hypothesis. This chemokine-like protein may therefore be expected to stimulate leukocyte, epithelial, stromal and neuronal cell migration, promote angiogenesis and vascular development, promote neuronal patterning, hematopoietic stem cell mobilization, keratinocyte and epithelial stem cell patterning and development, activation and proliferation of leukocytes, and promotion of migration in wound healing events. It has recently been shown that receptors to chemokines act as co-receptors for HIV-1 infection of CD4+ cells (Cairns *et al.*, *Nature Medicine* 4:563-568, 1998) and that high circulating levels of chemokines can render a degree of immunity to those exposed to the HIV virus (Zagury *et al.*, *Proc. Natl. Acad. Sci. USA* 95:3857-3861, 1998). This novel gene and its encoded protein may thus be usefully employed as regulators of epithelial, lymphoid, myeloid, stromal and neuronal cells migration and cancers; as agents for the treatment of cancers, neuro-degenerative diseases, inflammatory autoimmune diseases such as psoriasis, asthma and Crohns disease; for use in wound healing; and as agents for the prevention of HIV-1 binding and infection of leukocytes.

SEQ ID NOS: 1-72 are set out in the attached Sequence Listing. The codes for nucleotide sequences used in the attached Sequence Listing, including the symbol "n," conform to WIPO Standard ST.25 (1998), Appendix 2, Table 1.

All references cited herein, including patent references and non-patent publications, are hereby incorporated by reference in their entireties.

While in the foregoing specification this invention has been described in relation to certain preferred embodiments, and many details have been set forth for purposes of illustration, it will be apparent to those skilled in the art that the invention is susceptible to additional embodiments and that certain of the details

described herein may be varied considerably without departing from the basic principles of the invention.

We claim:

1. An isolated polynucleotide comprising a sequence selected from the group consisting of: (1) sequences recited in SEQ ID NOS: 1-35; (2) complements of the sequences recited in SEQ ID NOS: 1-35; (3) reverse
5 complements of the sequences recited in SEQ ID NOS: 1-35; (4) reverse sequences of the sequences recited in SEQ ID NOS: 1-35 (5) sequences having at least a 99% probability of being the same as a sequence recited in (1) – (4) above as determined using computer algorithm BLASTN; (6) sequences having at least 50% identity to a nucleotide sequence recited in (1) – (4) above determined using
10 computer algorithm BLASTN; (7) sequences having at least 75% identity to a nucleotide sequence recited in (1) – (4) above determined using computer algorithm BLASTN; (8) sequences having at least 90% identity to a nucleotide sequence recited in (1) – (4) above determined using computer algorithm BLASTN; (9) sequences having at least 95% identity to a nucleotide sequence
15 recited in (1) – (4) above determined using computer algorithm BLASTN; (10) nucleotide sequences that hybridize to a sequence recited in (1) – (4) above under stringent hybridization conditions; (11) nucleotide sequences that are 200-mers of a sequence recited in (1) – (4) above; (12) nucleotide sequences that are 100-mers of a sequence recited in (1) – (4) above; (13) nucleotide sequences that are 40-
20 mers of a sequence recited in (1) – (4) above; (14) nucleotide sequences that are 20-mers of a sequence recited in (1) – (4) above; and (15) nucleotide sequences that are degeneratively equivalent to a sequence recited in (1) – (4) above.

2. An oligonucleotide comprising at least 10 contiguous residues
25 complementary to 10 contiguous residues of a nucleotide sequence recited in claim 1.

3. A genetic construct comprising an isolated polynucleotide of claim
1.

4. A host cell transformed with a genetic construct of claim 3.

5. An isolated polypeptide encoded by a polynucleotide of claim 1.

5 6. An isolated polypeptide comprising an amino acid sequence
selected from the group consisting of: (a) sequences provided in SEQ ID NOS:
36-65; (b) sequences having at least a 99% probability of being the same as a
sequence of SEQ ID NOS: 36-65, as determined using the computer algorithm
BLASTP; (c) sequences having at least 50% identity to a sequence provided in
10 SEQ ID NOS: 36-65, as determined using the computer algorithm BLASTP; (d)
sequences having at least 75% identity to a sequence provided in SEQ ID NOS:
36-65, as determined using the computer algorithm BLASTP; (e) sequences
having at least 90% identity to a sequence provided in SEQ ID NOS: 36-65, as
determined using the computer algorithm BLASTP; and (f) sequences having at
15 least 95% identity to a sequence provided in SEQ ID NOS: 36-65, as determined
using the computer algorithm BLASTP.

7. An isolated polynucleotide encoding a polypeptide of claim 6.

20 8. An isolated polypeptide comprising at least a functional portion of
a polypeptide comprising an amino acid sequence selected from the group
consisting of: (a) sequences provided in SEQ ID NOS: 36-65; (b) sequences
having at least a 99% probability of being the same as a sequence of SEQ ID
NOS: 36-65, as determined using the computer algorithm BLASTP; (c) sequences
25 having at least 50% identity to a sequence provided in SEQ ID NOS: 36-65, as
determined using the computer algorithm BLASTP; (d) sequences having at least
75% identity to a sequence provided in SEQ ID NOS: 36-65, as determined using
the computer algorithm BLASTP; (e) sequences having at least 90% identity to a
sequence provided in SEQ ID NOS: 36-65, as determined using the computer
30 algorithm BLASTP and (f) sequences having at least 95% identity to a sequence

provided in SEQ ID NOS: 36-65, as determined using the computer algorithm BLASTP.

5 9. A composition comprising a polypeptide according to any one of claims 6 and 8 and at least one component selected from the group consisting of: physiologically acceptable carriers and immunostimulants.

10 10. A composition comprising a polynucleotide according to claim 1 and at least one component selected from the group consisting of pharmaceutically acceptable carriers and immunostimulants.

 11. A method for treating a disorder in a mammal comprising administering a composition according to claim 9.

15 12. A method for treating a disorder in a mammal comprising administering a composition according to claim 10.

20 13. A diagnostic kit comprising at least one oligonucleotide according to claim 2.

 14. An organism comprising a host cell according to claim 4.

SEQUENCE LISTING

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Murison, James G

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<213> Mouse

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<211> 1587

<212> DNA

<213> Mouse

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<211> 2494

<212> DNA

<213> Rat

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<213> Mouse

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<213> Mouse

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<211> 2617

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<211> 1930

<212> DNA

<213> Mouse

<400> 9

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 <211> 1480
 <212> DNA
 <213> Mouse

<400> 11

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<210> 12
 <211> 802
 <212> DNA
 <213> Mouse

<400> 12

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 <212> DNA

<213> Mouse

<400> 13

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<211> 915

<212> DNA

<213> Mouse

<400> 14

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<211> 1308

<212> DNA

<213> Mouse

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<211> 1288

<212> DNA

<213> Mouse

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<210> 17

<211> 999

<212> DNA

<213> Mouse

<400> 17

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<210> 18

<211> 2123

<212> DNA

<213> Mouse

<400> 18

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<210> 19

<211> 1391

<212> DNA

<213> Mouse

<400> 19

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<210> 20

<211> 1864

<212> DNA

<213> Mouse

<400> 20

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<210> 21

<211> 2324

<212> DNA

<213> Mouse

<400> 21

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<210> 22

<211> 1859

<212> DNA

<213> Mouse

<400> 22

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<210> 23
 <211> 724
 <212> DNA
 <213> Mouse

<400> 23
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 <212> DNA
 <213> Mouse

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<210> 25

<211> 881

<212> DNA

<213> Mouse

<400> 25

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<210> 26

<211> 556

<212> DNA

<213> Mouse

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<210> 27

<211> 750

<212> DNA

<213> Mouse

<400> 27

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<210> 28

<211> 1896

<212> DNA

<213> Mouse

<400> 28

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<210> 29

<211> 1854

<212> DNA

<213> Mouse

<400> 29

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<210> 30

<211> 2866

<212> DNA

<213> Mouse

<400> 30

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<210> 31

<211> 1093

<212> DNA

<213> Mouse

<400> 31

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ggctgctggg	cattttggaa	aatattccac	tcctggatgt	tataaaagtct	ggaggaggca	360
attctaattg	ccttggtggg	ggcctgctgg	gaaaactgac	gtcatcagtt	cctctcctga	420
acaacatcct	cgacataaaa	atcactgac	cgcagctgct	agaacttgg	cttgtagcaga	480
gtcctgatgg	ccatcgtctc	tatgtcacca	tccctctggg	cttgacactc	aacgtaaata	540
tgcccgtagt	tggaggtctt	ttgcaattgg	ctgtgaagct	gaacattact	gcagaagtct	600
tagccgtgaa	agacaatcag	gggaggattc	atctggttct	tggtagctgc	accactccc	660
ctggcagcct	gaaaatcagc	ttgctcaatg	gagtcactcc	tgttcaaagc	tttttagaca	720
acctcacagg	gatattgact	aaagtccttc	ctgagctgat	ccagggaag	gtatgtcctc	780
tggtaaatgg	gattctcagc	ggtttggtatg	tcaccctgg	gcacaacatt	gctgaattac	840
tgatccatgg	actacagttt	gtcatcaaa	tttaggcac	ccagggaagga	aggctatott	900
ggctgagctg	aatcattttct	tgctgctcag	tctcctgctc	cttgcccagt	ctccccggc	960
tcacagaaa	gggcccacat	cctggaaaat	tatgtcttcc	ttctcctcac	ggagcctgat	1020
ctcttcccat	caggcacgat	taatcctgtg	atcctcacta	aataaaatag	ctcttcatct	1080
gcaaaaaaaaa	aaa					1093

<210> 32

<211> 1353
<212> DNA
<213> Mouse

<400> 32
gaaacagtat gagcaaacac tgagctgagg ggagcttctg attaagagcg ctccccagcg 60
aggcccgagg ccgtgaacct tcccagcaag aggggtggtgg ttgctcctgg aagcctgcgc 120
ccagcagctg aagccatggc caccaccacg tgccagggtg tagggcttct cctgtccctc 180
ctgggtctgg ccggctgcat agccgccact gggatggaca tgtggagcac tcaagacctg 240
tatgacaacc cagtcaccgc cgtgttccag catgaaggcc tctggaggag ttgctgcaa 300
cagagctcgg ggttcaccga gtgccggcca tacttcacca tcctgggcct tccagccatg 360
ctgcaagctg tacgagccct gatgatcgtg ggcattgttc tgggggtcat cggtatcctc 420
gtgtccatct tcgccctgaa gtgcattcgc attggtagca tggatgactc tgccaaggcc 480
aagatgactc tgacttctgg gatcctgttc atcatctccg gcatctgtgc aatcattggt 540
gtgtctgtgt ttgccaacat gctggtgacc aacttctgga tgtccacagc taacatgtac 600
agcggcatgg gcggcatggg tggcatggtg cgaccggtc agaccaggta caccttcggt 660
gcagctctgt tcgtgggctg ggttgctgga ggcctcacc tgaattgggg agtgatgatg 720
tgcatcgccct gccgtggcct gacaccagat gacagcaact tcaaagctgt gtcttaccat 780
gcctctggcc aaaatgttgc ctacaggcct ggaggcttta aggccagcac tggctttggg 840
tccaacacca gaaacaagaa gatctacgat ggggggtgcc gcacagaaga cgatgaacag 900
tctcatccta ccaagtatga ctatgtgtag tgctctaaga cccgcccaacc tgtgtgcagg 960
aggaaccctt cccaagaag agctcacccc aaagcaacgg gagtctacct tgttcccttg 1020
ttgatttcaa tgcacatctg aaagtggta aagcctgatt ttcattccata gggaggctag 1080
acagtcttgg ccacatgtgt ctgcctctaa atatccatc acaaaacagc tgagttatcg 1140
tttatgagtt agaggccata acactcactt tagcccaacc ctctgctttt taccgtagac 1200
tttcttttca tctggtgatg gaatggaatt tgactcacag actaatactt taatggttta 1260
gagaaacttt ctttctcgt acttaataag cctgctgatg gtcgattttc cagcttgacc 1320
accaagggaa attttaaaaa aaaaaaaaaa aaa 1353

<210> 33
<211> 1046
<212> DNA
<213> Mouse

<400> 33
gcctcagtc acagctgtct cccagctgc ttccagtga caccceggca gtctaggctc 60
ccacagcaat gagttggtgg agggacaact tctggatcat cttagctatg tccatcatct 120
tcatctccct ggtcctgggt ctcatcctgt actgtgtctg cagggtggcag cttagacaag 180
gcaggaactg ggaaattgct aagccctcaa aacaggatgg aagagatgaa gaaaagatgt 240
atgagaatgt tcttaattct tcaccaggcc agttacctgc tctgccaccc aggggttcac 300
cttttccagg agacctagcc ccacaggaag ctccaagaca accctcagct tggtaactcat 360
cagtgaagaa agttaggaac aagaaggctt ttgctatctc gggctccacc gagccagaaa 420
atgattatga tgatgttgag attccagcaa ccaccgaaac ccagcactct aaaaccacac 480
ctttttggca agctgaagtg ggtttacaca gctcgtttta gaatactcta gaatagccgg 540
attataacac aagcacttcc taatccccag aggaagccac ctccagccatg tgaagctac 600
agcagaagac aggacagctt gatgttcccg aggcctccaga tgtttctggt gctccagatg 660
tttctgctgc tccagatggt tctgttgctc caaatatttc tgctgctcca gatgtttctg 720
ttgctccaga tgtttctggt gctccagatg ctccgtgtgc tccagatgct cctgatgttt 780
ctgacactgc agaagctcta cccaagatt ctgaggatgt ggccttggca cctttgtgga 840
ggaagtgtcc ttagtgacga ccactgggcc tgtgagaact gactcatttc tcaacatttt 900
ctttcgttcc ctgggtgaat gtagctgtaa ggcagtgact ctcaaccttc ctaatgcagg 960
gatecttcaa tacaattcct tatttgtggt gatcctcaac cataaaatta ttttgttgct 1020
acttcaaaaa aaaaaaaaaa aaaaaa 1046

<210> 34
<211> 1261
<212> DNA

<213> Mouse

<400> 34

gcacagacgg	gtaaaccgct	tgggaacctc	gaggaaaaag	aggctacgaa	aaccttttcc	60
taagaggcta	caaatttggg	agcagggaaa	acccagacat	gagatgtttt	tagtttatatt	120
ctccagaagg	gggcactgta	tcaattatgt	gaaggggacat	gcagacagcc	tagctccatg	180
gtgctgtggg	gtaggactga	ggagccctct	ggccagaccc	cagcacggcc	atgtctctcc	240
caaggatcat	gttcctggag	gtcacgcccc	tggctccttct	cataagtggc	tgtgcacagc	300
agctctctgg	aggtatttgg	aacattctgc	tgtcacacat	gggactgctc	ttcctgaagc	360
ccacgctgtt	cgtgggaaac	atgggaagaa	aggaagacgt	gttgtgtgct	gctcagtaga	420
cttcccaaaa	gccacctctc	tcttctgaaa	cgtcactgaa	tggactggag	aggactgcgg	480
gtttataaaa	ctgcttttta	tctgagaaca	atgggttttg	aaactagtct	cttttcttcc	540
cactttttaca	gagcttctca	aatcattcct	ccaggccctg	acttggacag	gtagggggggc	600
agaccctggg	tcccaagggt	cactgtccag	gcacactgcc	cacattgcta	agagaagagg	660
ccctgtctgcc	agtggaccct	tcaccccaca	cgagacacct	gtcttgcctt	taggacaccc	720
tccctctagag	agtgggtgtg	gaaggagggg	acctatgtaa	ggagttgggg	caggcatgaa	780
tctgccaaat	actggatatg	gatccaaggc	tggcccaggc	acctgcacct	ccagtgaagt	840
gtcagcagggt	ggcgtctgtg	cccgccaggc	ttcacagagt	ccctttaggg	agtctgtctc	900
cagatccctt	ctgggtgcaca	cttactggat	gtcactgcaa	gctctaccct	ctgagcagggt	960
gttgaccacac	agtggcgctg	accctggccc	cgcaacggca	actgctgaag	gcagccattg	1020
cctcagccat	tctcaagacc	cttcaatttt	taaaagcagt	tcgattctgt	aatattttatt	1080
tttctttttc	aggatgtttc	gttgcccgcg	agactgactg	cagtgtgcac	cattgcatga	1140
gccctgcctc	agtgcctctg	ggctccctgg	gcactgctgc	ccctctgtct	aaagctgact	1200
gtggcagcac	tgcccaacaa	taaagctgac	ctaaaagctg	aaaaaaaaaa	aaaaaaaaaa	1260
a						1261

<210> 35

<211> 995

<212> DNA

<213> Mouse

<400> 35

gctcaccgcg	gtccggggcg	gcgcaggccc	cgtctccttg	ccttccaggc	ctcatgcgct	60
cccgcgccgt	gctcccgcga	ccgctgcccg	gaggaggggg	gcccgcgttg	tctgcgcgtc	120
tacgcaggcc	tcataggcac	cgtggtcacc	cccaactacc	tggacaacgt	gagcgcgcgc	180
gttgcgcctt	ggtgcggctg	tgcggccagt	ggaaaccggc	gcgaagaatg	cgaagccttc	240
cgcaagctct	ttacaaggaa	cccctgcttg	gatgggtgcc	tacaagcctt	tgacagcttg	300
cagccatcag	ttctgcagga	ccagactgct	gggtgctggt	tcccgcgggt	gtcctggctg	360
tatgcactca	ctgccctggc	tctccaggcc	ctgctctgat	taggaacatg	aaccgtggac	420
gacacagctg	actgccatgt	ctcccgatga	ctgctcactg	agctgaaact	cccttgccct	480
caggctctgt	gcccttttga	ggcctggacc	cttgtgtggc	tgtcctctgg	attgggggct	540
ggaggctagg	gtctgactga	aaagcctgtg	ttcccctgtc	agtaggcata	ttgtccgttt	600
tcttccccat	cctagagctg	agcaccata	gatgaggcct	cattgggtcc	cctgggctta	660
cagagcagga	cagagactag	cccccgctcc	tagaattcgg	aactgtcctt	ttccaagatg	720
acaaggcact	aaggagatca	tatgaacagg	ctgacagaca	aggctgccta	aataccctcc	780
cagtttagcca	ttattcacca	ttaagcttac	ccgtgtcaca	gactgacgt	ggcttgtcac	840
ctatgacaca	gtgtgtagac	attaaggaga	gactgaggte	cctcctgctc	agcaccctac	900
tggcttccca	ggctttccct	gccatggttt	ccccagcacc	tgcaggggct	caataaaccc	960
atgtgcactg	agaaaaaaaa	aaaaaaaaaa	aaaaa			995

<210> 36

<211> 747

<212> PRT

<213> Rat

<400> 36

Glu Ala Thr Val Ile Thr Thr Glu Lys Arg Glu Arg Pro Ala Pro Pro

1	5	10	15
Arg Glu Leu Leu Val Pro Gln Ala Glu Val Thr Ala Arg Ser Leu Arg			
20	25	30	
Leu Gln Trp Val Pro Gly Ser Asp Gly Ala Ser Pro Ile Arg Tyr Phe			
35	40	45	
Thr Val Gln Val Arg Glu Leu Pro Gly Gly Glu Trp Gln Thr Tyr Ser			
50	55	60	
Ser Ser Ile Ser His Glu Ala Thr Leu Cys Ala Val Glu Arg Leu Arg			
65	70	75	80
Pro Phe Thr Ser Tyr Lys Leu Arg Leu Lys Ala Thr Asn Asp Ile Gly			
85	90	95	
Asp Ser Asp Phe Ser Ala Glu Thr Glu Ala Val Thr Thr Leu Gln Asp			
100	105	110	
Val Pro Gly Glu Pro Pro Gly Ser Val Ser Ala Thr Pro His Thr Thr			
115	120	125	
Ser Ser Val Leu Ile Gln Trp Gln Pro Pro Arg Asp Glu Ser Leu Asn			
130	135	140	
Gly Leu Leu Gln Gly Tyr Arg Ile Tyr Tyr Arg Glu Leu Glu Ser Glu			
145	150	155	160
Thr Gly Leu Ser Pro Glu Pro Lys Thr Leu Lys Ser Pro Ser Ala Leu			
165	170	175	
Arg Ala Glu Leu Thr Ala Gln Ser Ser Phe Lys Thr Val Asn Ser Ser			
180	185	190	
Ser Thr Leu Thr Thr Tyr Glu Leu Thr His Leu Lys Lys Tyr Arg Arg			
195	200	205	
Tyr Glu Val Ile Met Thr Ala Tyr Asn Ile Ile Gly Glu Ser Pro Ala			
210	215	220	
Ser Val Pro Val Glu Val Phe Val Gly Glu Ala Ala Pro Ala Met Ala			
225	230	235	240
Pro Gln Asn Ile Gln Val Thr Pro Leu Thr Ala Ser Gln Leu Glu Val			
245	250	255	
Thr Trp Asp Pro Pro Pro Pro Glu Ser Gln Asn Gly Asn Ile Gln Gly			
260	265	270	
Tyr Lys Val Tyr Tyr Trp Glu Ala Asp Ser Arg Asn Glu Thr Glu Lys			
275	280	285	
Met Lys Val Leu Phe Leu Pro Glu Pro Val Val Lys Ile Lys Asp Leu			
290	295	300	
Thr Ser His Thr Lys Tyr Leu Val Ser Ile Ser Ala Phe Asn Ala Ala			
305	310	315	320
Gly Asp Gly Pro Arg Ser Asp Pro Cys Gln Gly Arg Thr His Gln Ala			
325	330	335	
Ala Pro Gly Pro Pro Ser Phe Leu Glu Phe Ser Glu Ile Thr Ser Thr			
340	345	350	
Thr Leu Asn Val Ser Trp Gly Glu Pro Ser Ala Ala Asn Gly Ile Leu			
355	360	365	
Gln Gly Tyr Arg Val Val Tyr Glu Pro Leu Ala Pro Val Gln Gly Val			
370	375	380	
Ser Lys Val Val Thr Val Asp Val Lys Gly Asn Trp Gln Arg Trp Leu			
385	390	395	400
Lys Val Arg Asp Leu Thr Lys Gly Val Thr Tyr Phe Phe Arg Val Gln			
405	410	415	
Ala Arg Thr Ile Ala Tyr Gly Pro Glu Leu Gln Ala Asn Val Thr Ala			
420	425	430	
Gly Pro Ala Glu Gly Ser Pro Gly Ser Pro Arg Asn Val Leu Val Thr			
435	440	445	
Lys Ser Ala Ser Glu Leu Thr Leu Gln Trp Thr Glu Gly Asn Thr Gly			
450	455	460	

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Asn Thr Pro Thr Thr Gly Tyr Val Ile Glu Ala Arg Pro Ser Asp Glu
465      470      475      480
Gly Leu Trp Asp Met Phe Ala Lys Asp Ile Pro Arg Ser Ala Thr Ser
      485      490      495
Tyr Thr Val Gly Leu Asp Lys Leu Arg Gln Gly Val Thr Tyr Glu Phe
      500      505      510
Arg Val Val Ala Val Asn Lys Ala Gly Phe Gly Glu Pro Ser Arg Pro
      515      520      525
Ser Ile Ala Val Ser Ala Gln Ala Glu Ala Pro Phe Tyr Glu Glu Trp
      530      535      540
Trp Phe Leu Leu Val Ile Ala Leu Ser Ser Leu Leu Leu Val Leu Leu
545      550      555      560
Val Val Phe Val Leu Val Leu His Gly Gln Ser Lys Lys Tyr Lys Asn
      565      570      575
Cys Gly Ser Gly Lys Gly Ile Ser Asn Met Glu Glu Thr Val Thr Leu
      580      585      590
Asp Asn Gly Gly Phe Ala Ala Leu Glu Leu Asn Ser Arg His Leu Asn
      595      600      605
Val Lys Ser Thr Phe Ser Lys Lys Asn Gly Thr Arg Ser Pro Pro Arg
      610      615      620
Pro Ser Pro Gly Gly Leu His Tyr Ser Asp Glu Asp Ile Cys Asn Lys
625      630      635      640
Tyr Asn Gly Ala Val Leu Thr Glu Ser Val Asn Leu Lys Glu Lys Ser
      645      650      655
Val Asp Gly Ser Glu Ser Glu Ala Ser Asp Ser Asp Tyr Glu Glu Ala
      660      665      670
Leu Pro Lys His Ser Phe Val Asn His Tyr Met Ser Asp Pro Thr Tyr
      675      680      685
Tyr Asn Phe Trp Lys Arg Arg Pro Pro Ala Ala Ala Pro His Arg Tyr
690      695      700
Glu Ala Val Ala Gly Ala Glu Ala Gly Pro His Leu His Thr Val Ile
705      710      715      720
Thr Thr Gln Ser Ala Gly Gly Val Tyr Thr Pro Ala Gly Pro Gly Ala
      725      730      735
Arg Ala Pro Leu Thr Gly Phe Ser Ser Phe Val
      740      745

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<210> 37

<211> 205

<212> PRT

<213> Mouse

<400> 37

```

Met Leu Gly Thr Leu Val Trp Met Leu Ala Val Gly Phe Leu Leu Ala
1      5      10      15
Leu Ala Pro Gly Arg Ala Ala Gly Ala Leu Arg Thr Gly Arg Arg Pro
      20      25      30
Ala Arg Pro Arg Asp Cys Ala Asp Arg Pro Glu Glu Leu Leu Glu Gln
      35      40      45
Leu Tyr Gly Arg Leu Ala Ala Gly Val Leu Ser Ala Phe His His Thr
50      55      60
Leu Gln Leu Gly Pro Arg Glu Gln Ala Arg Asn Ala Ser Cys Pro Ala
65      70      75      80
Gly Gly Arg Ala Ala Asp Arg Arg Phe Arg Pro Pro Thr Asn Leu Arg
      85      90      95
Ser Val Ser Pro Trp Ala Tyr Arg Ile Ser Tyr Asp Pro Ala Arg Phe
      100      105      110

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Pro Arg Tyr Leu Pro Glu Ala Tyr Cys Leu Cys Arg Gly Cys Leu Thr
      115      120
Gly Leu Tyr Gly Glu Glu Asp Phe Arg Phe Arg Ser Thr Pro Val Phe
      130      135      140
Ser Pro Ala Val Val Leu Arg Arg Thr Ala Ala Cys Ala Gly Gly Arg
      145      150      155      160
Ser Val Tyr Ala Glu His Tyr Ile Thr Ile Pro Val Gly Cys Thr Cys
      165      170      175
Val Pro Glu Pro Asp Lys Ser Ala Asp Ser Ala Asn Ser Ser Met Asp
      180      185      190
Lys Leu Leu Leu Gly Pro Ala Asp Arg Pro Ala Gly Arg
      195      200      205

```

<210> 38
 <211> 238
 <212> PRT
 <213> Mouse

```

<400> 38
Met Leu Cys Phe Leu Arg Gly Met Ala Phe Val Pro Phe Leu Leu Val
  1      5      10      15
Thr Trp Ser Ser Ala Ala Phe Ile Ile Ser Tyr Val Val Ala Val Leu
      20      25      30
Ser Gly His Val Asn Pro Phe Leu Pro Tyr Ile Ser Asp Thr Gly Thr
      35      40      45
Thr Pro Pro Glu Ser Gly Ile Phe Gly Phe Met Ile Asn Phe Ser Ala
      50      55      60
Phe Leu Gly Ala Ala Thr Met Tyr Thr Arg Tyr Lys Ile Val Glu Lys
      65      70      75      80
Gln Asn Glu Thr Cys Tyr Phe Ser Thr Pro Val Phe Asn Leu Val Ser
      85      90      95
Leu Ala Leu Gly Leu Val Gly Cys Ile Gly Met Gly Ile Val Ala Asn
      100      105      110
Phe Gln Glu Leu Ala Val Pro Val His Asp Gly Gly Ala Leu Leu
      115      120      125
Ala Phe Val Cys Gly Val Val Tyr Thr Leu Leu Gln Ser Ile Ile Ser
      130      135      140
Tyr Lys Ser Cys Pro Gln Trp Asn Ser Leu Thr Thr Cys His Val Arg
      145      150      155      160
Met Ala Ile Ser Ala Val Ser Cys Ala Ala Val Val Pro Met Ile Ala
      165      170      175
Cys Ala Ser Leu Ile Ser Ile Thr Lys Leu Glu Trp Asn Pro Lys Glu
      180      185      190
Lys Asp Tyr Ile Tyr His Val Val Ser Ala Ile Cys Glu Trp Thr Val
      195      200      205
Ala Phe Gly Phe Ile Phe Tyr Phe Leu Thr Phe Ile Gln Asp Phe Gln
      210      215      220
Ser Val Thr Leu Arg Ile Ser Thr Glu Ile Asn Asp Asp Phe
      225      230      235

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<210> 39
 <211> 492
 <212> PRT
 <213> Mouse

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<400> 39
Leu Arg Leu Leu Leu Ala Trp Val Ala Ala Val Pro Ala Leu Gly Gln

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1	5	10	15
Val Pro Trp Thr	Pro Glu Pro Arg	Ala Cys Gly Pro	Ser Ser Cys
20	25	30	
Tyr Ala Leu Phe	Pro Arg Arg Arg	Thr Phe Leu Glu	Ala Trp Arg Ala
35	40	45	
Cys Arg Glu Leu	Gly Gly Asn Leu	Ala Thr Pro Arg	Thr Pro Glu Glu
50	55	60	
Ala Gln Arg Val	Asp Ser Leu Val	Gly Val Gly Pro	Ala Asn Gly Leu
65	70	75	80
Leu Trp Ile Gly	Leu Gln Arg Gln	Ala Arg Gln Cys	Gln Pro Gln Arg
85	90	95	
Pro Leu Arg Gly	Phe Ile Trp Thr	Thr Gly Asp Gln	Asp Thr Ala Phe
100	105	110	
Thr Asn Trp Ala	Gln Pro Ala Thr	Glu Gly Pro Cys	Pro Ala Gln Arg
115	120	125	
Cys Ala Ala Leu	Glu Ala Ser Gly	Glu His Arg Trp	Leu Glu Gly Ser
130	135	140	
Cys Thr Leu Ala	Val Asp Gly Tyr	Leu Cys Gln Phe	Gly Phe Glu Gly
145	150	155	160
Ala Cys Pro Ala	Leu Pro Leu Glu	Val Gly Gln Ala	Gly Pro Ala Val
165	170	175	
Tyr Thr Thr Pro	Phe Asn Leu Val	Ser Ser Glu Phe	Glu Trp Leu Pro
180	185	190	
Phe Gly Ser Val	Ala Ala Val Gln	Cys Gln Ala Gly	Arg Gly Ala Ser
195	200	205	
Leu Leu Cys Val	Lys Gln Pro Ser	Gly Gly Val Gly	Trp Ser Gln Thr
210	215	220	
Gly Pro Leu Cys	Pro Gly Thr Gly	Cys Gly Pro Asp	Asn Gly Gly Cys
225	230	235	240
Glu His Glu Cys	Val Glu Glu Val	Asp Gly Ala Val	Ser Cys Arg Cys
245	250	255	
Ser Glu Gly Phe	Arg Leu Ala Ala	Asp Gly His Ser	Cys Glu Asp Pro
260	265	270	
Cys Ala Gln Ala	Pro Cys Glu Gln	Cys Glu Pro Gly	Gly Gly Pro Gln
275	280	285	
Gly Tyr Ser Cys	His Cys Arg Leu	Gly Phe Arg Pro	Ala Glu Asp Asp
290	295	300	
Pro His Arg Cys	Val Asp Thr Asp	Glu Cys Gln Ile	Ala Gly Val Cys
305	310	315	320
Gln Gln Met Cys	Val Asn Tyr Val	Gly Gly Phe Glu	Cys Tyr Cys Ser
325	330	335	
Glu Gly His Glu	Leu Glu Ala Asp	Gly Ile Ser Cys	Ser Pro Ala Gly
340	345	350	
Ala Met Gly Ala	Gln Ala Ser Gln	Asp Leu Arg Asp	Glu Leu Leu Asp
355	360	365	
Asp Gly Glu Glu	Gly Glu Asp Glu	Glu Glu Pro Trp	Glu Asp Phe Asp
370	375	380	
Gly Thr Trp Thr	Glu Glu Gln Gly	Ile Leu Trp Leu	Ala Pro Thr His
385	390	395	400
Pro Pro Asp Phe	Gly Leu Pro Tyr	Arg Pro Asn Phe	Pro Gln Asp Gly
405	410	415	
Glu Pro Gln Arg	Leu His Leu Glu	Pro Thr Trp Pro	Pro Pro Leu Lys
420	425	430	
Ala Pro Lys Gly	Pro Gln Gln Pro	Pro Arg Gly Ala	Ala Lys Thr Pro
435	440	445	
Lys Gly Asn Pro	Ala Asn Pro Thr	His Thr Thr Phe	Cys Pro Gln Asp
450	455	460	

Leu Cys Tyr Phe Ser Tyr Thr Pro Thr Pro Glu Pro Cys Pro Pro Thr
 465 470 475 480
 Cys His Gly Pro Cys His Thr Ser Ser Cys Val Leu
 485 490

<210> 40
 <211> 464
 <212> PRT
 <213> Mouse

<400> 40

Met Gly Arg Ala Trp Gly Leu Leu Val Gly Leu Leu Gly Val Val Trp
 1 5 10 15
 Leu Leu Arg Leu Gly His Gly Glu Glu Arg Arg Pro Glu Thr Ala Ala
 20 25 30
 Gln Arg Cys Phe Cys Gln Val Ser Gly Tyr Leu Asp Asp Cys Thr Cys
 35 40 45
 Asp Val Glu Thr Ile Asp Lys Phe Asn Asn Tyr Arg Leu Phe Pro Arg
 50 55 60
 Leu Gln Lys Leu Leu Glu Ser Asp Tyr Phe Arg Tyr Tyr Lys Val Asn
 65 70 75 80
 Leu Lys Lys Pro Cys Pro Phe Trp Asn Asp Ile Asn Gln Cys Gly Arg
 85 90 95
 Arg Asp Cys Ala Val Lys Pro Cys His Ser Asp Glu Val Pro Asp Gly
 100 105 110
 Ile Lys Ser Ala Ser Tyr Lys Tyr Ser Glu Glu Ala Asn Arg Ile Glu
 115 120 125
 Glu Cys Glu Gln Ala Glu Arg Leu Gly Ala Val Asp Glu Ser Leu Ser
 130 135 140
 Glu Glu Thr Gln Lys Ala Val Leu Gln Trp Thr Lys His Asp Asp Ser
 145 150 155 160
 Ser Asp Ser Phe Cys Glu Ile Asp Asp Ile Gln Ser Pro Asp Ala Glu
 165 170 175
 Tyr Val Asp Leu Leu Asn Pro Glu Arg Tyr Thr Gly Tyr Lys Gly
 180 185 190
 Pro Asp Ala Trp Arg Ile Trp Ser Val Ile Tyr Glu Glu Asn Cys Phe
 195 200 205
 Lys Pro Gln Thr Ile Gln Arg Pro Leu Ala Ser Gly Arg Gly Lys Ser
 210 215 220
 Lys Glu Asn Thr Phe Tyr Asn Trp Leu Glu Gly Leu Cys Val Glu Lys
 225 230 235 240
 Arg Ala Phe Tyr Arg Leu Ile Ser Gly Leu His Ala Ser Ile Asn Val
 245 250 255
 His Leu Ser Ala Arg Tyr Leu Leu Gln Asp Thr Trp Leu Glu Lys Lys
 260 265 270
 Trp Gly His Asn Val Thr Glu Phe Gln Gln Arg Phe Asp Gly Ile Leu
 275 280 285
 Thr Glu Gly Glu Gly Pro Arg Arg Leu Arg Asn Leu Tyr Phe Leu Tyr
 290 295 300
 Leu Ile Glu Leu Arg Ala Leu Ser Lys Val Leu Pro Phe Phe Glu Arg
 305 310 315 320
 Pro Asp Phe Gln Leu Phe Thr Gly Asn Lys Val Gln Asp Ala Glu Asn
 325 330 335
 Lys Ala Leu Leu Leu Glu Ile Leu His Glu Ile Lys Ser Phe Pro Leu
 340 345 350
 His Phe Asp Glu Asn Ser Phe Phe Ala Gly Asp Lys Asn Glu Ala His
 355 360 365

Lys Leu Lys Glu Asp Phe Arg Leu His Phe Arg Asn Ile Ser Arg Ile
 370 375 380
 Met Asp Cys Val Gly Cys Phe Lys Cys Arg Leu Trp Gly Lys Leu Gln
 385 390 395 400
 Thr Gln Gly Leu Gly Thr Ala Leu Lys Ile Leu Phe Ser Glu Lys Leu
 405 410 415
 Ile Ala Asn Met Pro Glu Ser Gly Pro Ser Tyr Glu Phe Gln Leu Thr
 420 425 430
 Arg Gln Glu Ile Val Ser Leu Phe Asn Ala Phe Gly Arg Ile Ser Thr
 435 440 445
 Ser Val Arg Glu Leu Glu Asn Phe Arg His Leu Leu Gln Asn Val His
 450 455 460

<210> 41
 <211> 148
 <212> PRT
 <213> Rat

<400> 41
 Leu Asn Trp Gln Ile Lys Lys Tyr Asp Thr Lys Ala Ala Tyr Cys Gln
 1 5 10 15
 Ser Lys Leu Ala Val Val Leu Phe Thr Lys Glu Leu Ser Arg Arg Leu
 20 25 30
 Gln Gly Thr Gly Val Thr Val Asn Ala Leu His Pro Gly Val Ala Arg
 35 40 45
 Thr Glu Leu Gly Arg His Thr Gly Met His Asn Ser Ala Phe Ser Gly
 50 55 60
 Phe Met Leu Gly Pro Phe Trp Leu Leu Phe Lys Ser Pro Gln Leu
 65 70 75 80
 Ala Ala Gln Pro Ser Thr Tyr Leu Ala Val Ala Glu Glu Leu Glu Ser
 85 90 95
 Val Ser Gly Lys Tyr Phe Asp Gly Leu Arg Glu Lys Ala Pro Ser Pro
 100 105 110
 Glu Ala Glu Asp Glu Glu Val Ala Arg Arg Leu Trp Thr Glu Ser Ala
 115 120 125
 His Leu Val Gly Leu Asp Met Ala His Gly Ser Ser Gly Arg Gly His
 130 135 140
 Ser Ile Ser Arg
 145

<210> 42
 <211> 228
 <212> PRT
 <213> Mouse

<400> 42
 Met Gly Phe Leu Leu Leu Leu Leu His Ala Ala Ile Ala Gly His
 1 5 10 15
 Lys Asn Tyr Gly Thr His Asn His Cys Trp Leu Ser Leu His Arg Gly
 20 25 30
 Phe Ile Trp Ser Phe Leu Gly Pro Ala Ala Ala Ile Ile Leu Ile Asn
 35 40 45
 Leu Val Phe Tyr Phe Leu Ile Trp Ile Leu Arg Ser Lys Leu Ser
 50 55 60
 Ser Leu Asn Lys Glu Val Ser Thr Leu Gln Asp Thr Lys Val Met Thr
 65 70 75 80
 Phe Lys Ala Ile Val Gln Leu Phe Val Leu Gly Cys Ser Trp Gly Ile

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<210> 43
<211> 373
<212> PRT
<213> Mouse
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Met 1	Lys	Glu	Tyr	Val 5	Met	Leu	Leu	Leu	Leu 10	Ala	Val	Cys	Ser	Ala 15	Lys
Pro	Phe	Phe	Ser 20	Pro	Ser	His	Thr	Ala 25	Leu	Lys	Asn	Met 30	Met	Leu	Lys
Asp	Met	Glu 35	Asp	Thr	Asp	Asp	Asp 40	Asp	Asn	Asp	Asp 45	Asp	Asn	Asn	Ser
Leu	Phe 50	Pro	Thr	Lys	Glu	Pro 55	Val	Asn	Pro	Phe	Phe 60	Pro	Phe	Asp	Leu
Phe 65	Pro	Thr	Cys	Pro	Phe 70	Gly	Cys	Gln	Cys	Tyr 75	Ser	Arg	Val	Val	His 80
Cys	Ser	Asp	Leu	Gly 85	Leu	Thr	Ser	Val	Pro	Asn 90	Asn	Ile	Pro	Phe 95	Asp
Thr	Arg	Met	Val 100	Asp	Leu	Gln	Asn	Asn 105	Lys	Ile	Lys	Glu	Ile 110	Lys	Glu
Asn	Asp	Phe 115	Lys	Gly	Leu	Thr	Ser 120	Leu	Tyr	Ala	Leu	Ile 125	Leu	Asn	Asn
Asn	Lys 130	Leu	Thr	Lys	Ile	His 135	Pro	Lys	Thr	Phe	Leu 140	Thr	Thr	Lys	Lys
Leu 145	Arg	Arg	Leu	Tyr	Leu 150	Ser	His	Asn	Gln	Leu 155	Ser	Glu	Ile	Pro	Leu 160
Asn	Leu	Pro	Lys 165	Ser	Leu	Ala	Glu	Leu	Arg 170	Ile	His	Asp	Asn	Lys 175	Val
Lys	Lys	Ile	Gln 180	Lys	Asp	Thr	Phe	Lys 185	Gly	Met	Asn	Ala	Leu 190	His	Val
Leu	Glu	Met 195	Ser	Ala	Asn	Pro	Leu 200	Glu	Asn	Asn	Gly	Ile 205	Glu	Pro	Gly
Ala 210	Phe	Glu	Gly	Val	Thr	Val 215	Phe	His	Ile	Arg	Ile 220	Ala	Glu	Ala	Lys
Leu 225	Thr	Ser	Ile	Pro	Lys 230	Gly	Leu	Pro	Pro	Thr 235	Leu	Leu	Glu	Leu	His 240
Leu	Asp	Phe	Asn	Lys	Ile	Ser	Thr	Val	Glu	Leu	Glu	Asp	Leu	Lys	Arg

				245					250					255			
Tyr	Arg	Glu	Leu	Gln	Arg	Leu	Gly	Leu	Gly	Asn	Asn	Arg	Ile	Thr	Asp		
			260					265					270				
Ile	Glu	Asn	Gly	Thr	Phe	Ala	Asn	Ile	Pro	Arg	Val	Arg	Glu	Ile	His		
		275					280					285					
Leu	Glu	His	Asn	Lys	Leu	Lys	Lys	Ile	Pro	Ser	Gly	Leu	Gln	Glu	Leu		
	290					295					300						
Lys	Tyr	Leu	Gln	Ile	Ile	Phe	Leu	His	Tyr	Asn	Ser	Ile	Ala	Lys	Val		
305					310					315					320		
Gly	Val	Asn	Asp	Phe	Cys	Pro	Thr	Val	Pro	Lys	Met	Lys	Lys	Ser	Leu		
			325					330						335			
Tyr	Ser	Ala	Ile	Ser	Leu	Phe	Asn	Asn	Pro	Met	Lys	Tyr	Trp	Glu	Ile		
		340					345						350				
Gln	Pro	Ala	Thr	Phe	Arg	Cys	Val	Leu	Gly	Arg	Met	Ser	Val	Gln	Leu		
	355					360						365					
Gly	Asn	Val	Gly	Lys													
	370																

<210> 44

<211> 466

<212> PRT

<213> Mouse

<400> 44

Met	Trp	Gly	Cys	Trp	Leu	Gly	Leu	Leu	Leu	Leu	Leu	Leu	Ala	Gly	Gln		
1				5				10					15				
Ala	Ala	Leu	Glu	Ala	Arg	Arg	Ser	Arg	Trp	Arg	Arg	Glu	Leu	Ala	Pro		
		20					25					30					
Gly	Leu	His	Leu	Arg	Gly	Ile	Arg	Asp	Ala	Gly	Gly	Arg	Tyr	Cys	Gln		
	35				40						45						
Glu	Gln	Asp	Met	Cys	Cys	Arg	Gly	Arg	Ala	Asp	Glu	Cys	Ala	Leu	Pro		
	50				55					60							
Tyr	Leu	Gly	Ala	Thr	Cys	Tyr	Cys	Asp	Leu	Phe	Cys	Asn	Arg	Thr	Val		
65				70				75					80				
Ser	Asp	Cys	Cys	Pro	Asp	Phe	Trp	Asp	Phe	Cys	Leu	Gly	Ile	Pro	Pro		
			85					90					95				
Pro	Phe	Pro	Pro	Val	Gln	Gly	Cys	Met	His	Gly	Gly	Arg	Ile	Tyr	Pro		
		100					105					110					
Val	Phe	Gly	Thr	Tyr	Trp	Asp	Asn	Cys	Asn	Arg	Cys	Thr	Cys	His	Glu		
	115					120					125						
Gly	Gly	His	Trp	Glu	Cys	Asp	Gln	Glu	Pro	Cys	Leu	Val	Asp	Pro	Asp		
	130				135						140						
Met	Ile	Lys	Ala	Ile	Asn	Arg	Gly	Asn	Tyr	Gly	Trp	Gln	Ala	Gly	Asn		
145				150				155					160				
His	Ser	Ala	Phe	Trp	Gly	Met	Thr	Leu	Asp	Glu	Gly	Ile	Arg	Tyr	Arg		
			165				170						175				
Leu	Gly	Thr	Ile	Arg	Pro	Ser	Ser	Thr	Val	Met	Asn	Met	Asn	Glu	Ile		
		180					185					190					
Tyr	Thr	Val	Leu	Gly	Gln	Gly	Glu	Val	Leu	Pro	Thr	Ala	Phe	Glu	Ala		
	195					200					205						
Ser	Glu	Lys	Trp	Pro	Asn	Leu	Ile	His	Glu	Pro	Leu	Asp	Gln	Gly	Asn		
	210				215						220						
Cys	Ala	Gly	Ser	Trp	Ala	Phe	Ser	Thr	Ala	Ala	Val	Ala	Ser	Asp	Arg		
225				230				235							240		
Val	Ser	Ile	His	Ser	Leu	Gly	His	Met	Thr	Pro	Ile	Leu	Ser	Pro	Gln		
			245				250						255				
Asn	Leu	Leu	Ser	Cys	Asp	Thr	His	His	Gln	Gln	Gly	Cys	Arg	Gly	Gly		

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<210> 45
<211> 422
<212> PRT
<213> Mouse
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<400> 45

Met 1	Asp 10	Phe 15	Trp 20	Leu 25	Trp 30	Leu 35	Leu 40	Tyr 45	Phe 50	Leu 55	Pro 60	Val 65	Ser 70	Gly 75	Ala 80
Leu 85	Arg 90	Val 95	Leu 100	Pro 105	Glu 110	Val 115	Gln 120	Leu 125	Asn 130	Val 135	Glu 140	Trp 145	Gly 150	Gly 155	Ser 160
Ile 165	Ile 170	Ile 175	Glu 180	Cys 185	Pro 190	Leu 195	Pro 200	Gln 205	Leu 210	His 215	Val 220	Arg 225	Met 230	Tyr 235	Leu 240
Cys 245	Arg 250	Gln 255	Met 260	Ala 265	Lys 270	Pro 275	Gly 280	Ile 285	Cys 290	Ser 295	Thr 300	Val 305	Val 310	Ser 315	Asn 320
Thr 325	Phe 330	Val 335	Lys 340	Lys 345	Glu 350	Tyr 355	Glu 360	Arg 365	Arg 370	Val 375	Thr 380	Leu 385	Thr 390	Pro 395	Cys 400
Leu 405	Asp 410	Lys 415	Lys 420	Leu 425	Phe 430	Leu 435	Val 440	Glu 445	Met 450	Thr 455	Gln 460	Leu 465	Thr 470	Glu 475	Asn 480
Asp 485	Asp 490	Gly 495	Ile 500	Tyr 505	Ala 510	Cys 515	Gly 520	Val 525	Gly 530	Met 535	Lys 540	Thr 545	Asp 550	Lys 555	Gly 560
Lys 565	Thr 570	Gln 575	Lys 580	Ile 585	Thr 590	Leu 595	Asn 600	Val 605	His 610	Asn 615	Glu 620	Tyr 625	Pro 630	Glu 635	Pro 640
Phe 645	Trp 650	Glu 655	Asp 660	Glu 665	Trp 670	Thr 675	Ser 680	Glu 685	Arg 690	Pro 695	Arg 700	Trp 705	Leu 710	His 715	Arg 720
Phe 725	Leu 730	Gln 735	His 740	Gln 745	Met 750	Pro 755	Trp 760	Leu 765	His 770	Gly 775	Ser 780	Glu 785	His 790	Pro 795	Ser 800
Ser 805	Ser 810	Gly 815	Val 820	Ile 825	Ala 830	Lys 835	Val 840	Thr 845	Thr 850	Pro 855	Ala 860	Ser 865	Lys 870	Thr 875	Glu 880
Ala 885	Pro 890	Pro 895	Val 900	His 905	Gln 910	Pro 915	Ser 920	Ser 925	Ile 930	Thr 935	Ser 940	Val 945	Thr 950	Gln 955	His 960

Pro	Arg	Val	180	Arg	Ala	Phe	Ser	185	Val	Ser	Ala	Thr	Lys	190	Ser	Pro	Ala
		195					200						205				
Leu	Leu	Pro	Ala	Thr	Thr	Ala	Ser	Lys	Thr	Ser	Thr	Gln	Gln	Ala	Ile		
	210					215					220						
Arg	Pro	Leu	Glu	Ala	Ser	Tyr	Ser	His	His	Thr	Arg	Leu	His	Glu	Gln		
225					230					235					240		
Arg	Thr	Arg	His	His	Gly	Pro	His	Tyr	Gly	Arg	Glu	Asp	Arg	Gly	Leu		
			245						250					255			
His	Ile	Pro	Ile	Pro	Glu	Phe	His	Ile	Leu	Ile	Pro	Thr	Phe	Leu	Gly		
		260						265					270				
Phe	Leu	Leu	Leu	Val	Leu	Leu	Gly	Leu	Val	Val	Lys	Arg	Ala	Ile	Gln		
	275						280					285					
Arg	Arg	Arg	Ala	Ser	Ser	Arg	Arg	Ala	Gly	Arg	Leu	Ala	Met	Arg	Arg		
	290					295					300						
Arg	Gly	Arg	Gly	Ala	Ser	Arg	Pro	Phe	Pro	Thr	Gln	Arg	Arg	Asp	Ala		
305					310					315					320		
Pro	Gln	Arg	Pro	Arg	Ser	Gln	Asn	Asn	Val	Tyr	Ser	Ala	Cys	Pro	Arg		
				325					330					335			
Arg	Ala	Arg	Gly	Pro	Asp	Ser	Leu	Gly	Pro	Ala	Glu	Ala	Pro	Leu	Leu		
			340					345					350				
Asn	Ala	Pro	Ala	Ser	Ala	Ser	Pro	Ala	Ser	Pro	Gln	Val	Leu	Glu	Ala		
	355						360					365					
Pro	Trp	Pro	His	Thr	Pro	Ser	Leu	Lys	Met	Ser	Cys	Glu	Tyr	Val	Ser		
	370					375					380						
Leu	Gly	Tyr	Gln	Pro	Ala	Val	Asn	Leu	Glu	Asp	Pro	Asp	Ser	Asp	Asp		
385					390					395					400		
Tyr	Ile	Asn	Ile	Pro	Asp	Pro	Ser	His	Leu	Pro	Ser	Tyr	Ala	Pro	Gly		
			405						410					415			
Pro	Arg	Ser	Ser	Cys	Gln												
			420														

<210> 46

<211> 228

<212> PRT

<213> Mouse

<400> 46

Met	Lys	Ala	Leu	Arg	Ala	Val	Leu	Leu	Ile	Leu	Leu	Leu	Ser	Gly	Gln		
1			5						10					15			
Pro	Gly	Ser	Gly	Trp	Ala	Gln	Glu	Asp	Gly	Asp	Ala	Asp	Pro	Glu	Pro		
			20					25					30				
Glu	Asn	Tyr	Asn	Tyr	Asp	Asp	Asp	Asp	Asp	Glu	Glu	Glu	Glu	Glu	Glu		
	35						40					45					
Thr	Asn	Met	Ile	Pro	Gly	Ser	Arg	Asp	Arg	Ala	Pro	Leu	Gln	Cys	Tyr		
	50					55					60						
Phe	Cys	Gln	Val	Leu	His	Ser	Gly	Glu	Ser	Cys	Asn	Gln	Thr	Gln	Ser		
65					70					75					80		
Cys	Ser	Ser	Ser	Lys	Pro	Phe	Cys	Ile	Thr	Leu	Val	Ser	His	Ser	Gly		
				85					90					95			
Thr	Asp	Lys	Gly	Tyr	Leu	Thr	Thr	Tyr	Ser	Met	Trp	Cys	Thr	Asp	Thr		
			100					105					110				
Cys	Gln	Pro	Ile	Ile	Lys	Thr	Val	Gly	Gly	Thr	Gln	Met	Thr	Gln	Thr		
		115					120					125					
Cys	Cys	Gln	Ser	Thr	Leu	Cys	Asn	Ile	Pro	Pro	Trp	Gln	Asn	Pro	Gln		
	130					135					140						
Val	Gln	Asn	Pro	Leu	Gly	Gly	Arg	Ala	Asp	Ser	Pro	Leu	Glu	Ser	Gly		

145					150					155				160
Thr	Arg	His	Pro	Gln	Gly	Gly	Lys	Phe	Ser	His	Pro	Gln	Val	Val
				165					170					175
Ala	Ala	His	Pro	Gln	Ser	Asp	Gly	Ala	Asn	Leu	Pro	Lys	Ser	Gly
			180					185					190	
Ala	Asn	Gln	Pro	Gln	Gly	Ser	Gly	Ala	Gly	Tyr	Pro	Ser	Gly	Trp
	195						200				205			Thr
Lys	Phe	Gly	Asn	Ile	Ala	Leu	Leu	Leu	Ser	Phe	Phe	Thr	Cys	Leu
	210					215					220			Trp
Ala	Ser	Gly	Ala											
225														

<210> 47
 <211> 269
 <212> PRT
 <213> Mouse

<400> 47														
Gly	Cys	Ser	Asp	Gly	Glu	Asn	Gln	Arg	Ser	Gly	His	Leu	Ser	Val
1				5					10					15
Leu	Gln	Leu	Ser	Leu	Lys	Val	Leu	Leu	Ile	Arg	Met	Ala	Ser	Gly
			20					25					30	Trp
Phe	Tyr	Leu	Ser	Cys	Met	Val	Leu	Gly	Ser	Leu	Gly	Ser	Met	Cys
	35						40				45			Ile
Leu	Phe	Thr	Ala	Tyr	Trp	Met	Gln	Tyr	Trp	Arg	Gly	Gly	Phe	Ala
	50					55				60				Trp
Asp	Gly	Thr	Val	Leu	Met	Phe	Asn	Trp	His	Pro	Val	Leu	Met	Val
65				70					75					80
Gly	Met	Val	Val	Leu	Tyr	Gly	Ala	Ala	Ser	Leu	Val	Tyr	Arg	Leu
			85						90					95
Ser	Ser	Trp	Val	Gly	Pro	Arg	Leu	Pro	Trp	Lys	Val	Leu	His	Ala
			100					105					110	Ala
Leu	His	Leu	Leu	Ala	Phe	Thr	Cys	Thr	Val	Val	Gly	Leu	Ile	Ala
	115						120					125		Val
Phe	Arg	Phe	His	Asn	His	Ser	Arg	Ile	Ala	His	Leu	Tyr	Ser	Leu
	130					135					140			His
Ser	Trp	Leu	Gly	Ile	Thr	Thr	Val	Val	Leu	Phe	Ala	Cys	Gln	Trp
145					150				155					160
Leu	Gly	Phe	Ala	Val	Phe	Leu	Leu	Pro	Trp	Ala	Ser	Gln	Trp	Leu
			165						170					175
Ser	Leu	Leu	Lys	Pro	Leu	His	Val	Phe	Phe	Gly	Ala	Cys	Ile	Leu
			180					185					190	Ser
Leu	Ser	Ile	Thr	Ser	Val	Ile	Ser	Gly	Ile	Asn	Glu	Lys	Leu	Phe
	195						200				205			Phe
Val	Leu	Lys	Asn	Ala	Thr	Lys	Pro	Tyr	Ser	Ser	Leu	Pro	Gly	Glu
	210				215						220			Ala
Val	Phe	Ala	Asn	Ser	Thr	Gly	Leu	Leu	Val	Val	Ala	Phe	Gly	Leu
225					230				235					240
Val	Leu	Tyr	Val	Leu	Leu	Ala	Ser	Ser	Trp	Lys	Arg	Pro	Asp	Pro
			245					250					255	Gly
Ala	Leu	Thr	Asp	Arg	Gln	Pro	Leu	Leu	His	Asp	Arg	Glu		
			260					265						

<210> 48
 <211> 188
 <212> PRT
 <213> Mouse

<400> 48

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Met Arg Leu Pro Leu Pro Leu Leu Leu Leu Phe Gly Cys Arg Ala Ile
 1           5           10
Leu Gly Ser Ala Gly Asp Arg Val Ser Leu Ser Ala Ser Ala Pro Thr
          20          25          30
Leu Asp Asp Glu Glu Lys Tyr Ser Ala His Met Pro Ala His Leu Arg
          35          40          45
Cys Asp Ala Cys Arg Ala Val Ala Phe Gln Met Gly Gln Arg Leu Ala
          50          55          60
Lys Ala Glu Ala Lys Ser His Thr Pro Asp Ala Ser Gly Leu Gln Glu
65          70          75          80
Leu Ser Glu Ser Thr Tyr Thr Asp Val Leu Asp Gln Thr Cys Ser Gln
          85          90          95
Asn Trp Gln Ser Tyr Gly Val His Glu Val Asn Gln Met Lys Arg Leu
          100          105          110
Thr Gly Pro Gly Leu Ser Lys Gly Pro Glu Pro Arg Ile Ser Val Met
          115          120          125
Ile Ser Gly Gly Pro Trp Pro Asn Arg Leu Ser Lys Thr Cys Phe His
          130          135          140
Tyr Leu Gly Glu Phe Gly Glu Asp Gln Ile Tyr Glu Ala Tyr Arg Gln
145          150          155          160
Gly Gln Ala Asn Leu Glu Ala Leu Leu Cys Gly Gly Thr His Gly Pro
          165          170          175
Cys Ser Gln Glu Ile Leu Ala Gln Arg Glu Glu Leu
          180          185

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<210> 49

<211> 247

<212> PRT

<213> Mouse

<400> 49

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Met Ile Pro Gln Val Val Thr Ser Glu Thr Val Thr Val Ile Ser Pro
 1           5           10
Asn Gly Ile Ser Phe Pro Gln Thr Asp Lys Pro Gln Pro Ser His Gln
          20          25          30
Ser Gln Asp Arg Leu Lys Lys His Leu Lys Ala Glu Ile Lys Val Met
          35          40          45
Ala Ala Ile Gln Ile Met Cys Ala Val Met Val Leu Ser Leu Gly Ile
          50          55          60
Ile Leu Ala Ser Val Pro Ser Asn Leu His Phe Thr Ser Val Phe Ser
65          70          75          80
Ile Leu Leu Glu Ser Gly Tyr Pro Phe Val Gly Ala Leu Phe Phe Ala
          85          90          95
Ile Ser Gly Ile Leu Ser Ile Val Thr Glu Lys Lys Met Thr Lys Pro
          100          105          110
Leu Val His Ser Ser Leu Ala Leu Ser Ile Leu Ser Val Leu Ser Ala
          115          120          125
Leu Thr Gly Ile Ala Ile Leu Ser Val Ser Leu Ala Ala Leu Glu Pro
          130          135          140
Ala Leu Gln Gln Cys Lys Leu Ala Phe Thr Gln Leu Asp Thr Thr Gln
145          150          155          160
Asp Ala Tyr His Phe Phe Ser Pro Glu Pro Leu Asn Ser Cys Phe Val
          165          170          175
Ala Lys Ala Ala Leu Thr Gly Val Phe Ser Leu Met Leu Ile Ser Ser
          180          185          190

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Val Leu Glu Leu Gly Leu Ala Val Leu Thr Ala Thr Leu Trp Trp Lys
 195 200 205
 Gln Ser Ser Ser Ala Phe Ser Gly Asn Val Ile Phe Leu Ser Gln Asn
 210 215 220
 Ser Lys Asn Lys Ser Ser Val Ser Ser Glu Ser Leu Cys Asn Pro Thr
 225 230 235 240
 Tyr Glu Asn Ile Leu Thr Ser
 245

<210> 50
 <211> 182
 <212> PRT
 <213> Mouse

<400> 50
 Pro Phe His Cys His Val Trp Ser Leu Cys Leu Gln Gly Ser Lys Gln
 1 5 10 15
 Ser Gly Leu Cys Gln Val Gln Arg Asp Leu Gly Arg Asp Asp Arg Ser
 20 25 30
 Val Arg Gly Ser Lys Ala Ala Val Val Ala Gly Ala Val Val Gly Thr
 35 40 45
 Phe Val Gly Leu Val Leu Ile Ala Gly Leu Val Leu Leu Tyr Gln Arg
 50 55 60
 Arg Ser Lys Thr Leu Glu Glu Leu Ala Asn Asp Ile Lys Glu Asp Ala
 65 70 75 80
 Ile Ala Pro Arg Thr Leu Pro Trp Thr Lys Gly Ser Asp Thr Ile Ser
 85 90 95
 Lys Asn Gly Thr Leu Ser Ser Val Thr Ser Ala Arg Ala Leu Arg Pro
 100 105 110
 Pro Lys Ala Ala Pro Pro Arg Pro Gly Thr Phe Thr Pro Thr Pro Ser
 115 120 125
 Val Ser Ser Gln Ala Leu Ser Ser Pro Arg Leu Pro Arg Val Asp Glu
 130 135 140
 Pro Pro Pro Gln Ala Val Ser Leu Thr Pro Gly Gly Val Ser Ser Ser
 145 150 155 160
 Ala Leu Ser Arg Met Gly Ala Val Pro Val Met Val Pro Ala Gln Ser
 165 170 175
 Gln Ala Gly Ser Leu Val
 180

<210> 51
 <211> 248
 <212> PRT
 <213> Mouse

<400> 51
 Met Ser Trp Ser Pro Ile Leu Pro Phe Leu Ser Leu Leu Leu Leu Leu
 1 5 10 15
 Phe Pro Leu Glu Val Pro Arg Ala Ala Thr Ala Ser Leu Ser Gln Ala
 20 25 30
 Ser Ser Glu Gly Thr Thr Thr Cys Lys Val His Asp Val Cys Leu Leu
 35 40 45
 Gly Pro Arg Pro Leu Pro Pro Ser Pro Pro Val Arg Val Ser Leu Tyr
 50 55 60
 Tyr Glu Ser Leu Cys Gly Ala Cys Arg Tyr Phe Leu Val Arg Asp Leu
 65 70 75 80
 Phe Pro Thr Trp Leu Met Val Met Glu Ile Met Asn Ile Thr Leu Val

225 230 235 240
 Pro Gly Ser Leu Leu Ala His Ser Phe Gln Gln Leu Asp Arg Ile Asp
 245 250 255
 Ser Leu Ser Glu Gln Val Ser Phe Leu Glu Glu His Leu Gly Ser Cys
 260 265 270
 Ser Cys Lys Lys Asp Leu
 275

<210> 53
 <211> 409
 <212> PRT
 <213> Mouse

<400> 53
 Met Lys Leu Lys Gln Arg Val Val Leu Leu Ala Ile Leu Leu Val Ile
 1 5 10 15
 Phe Ile Phe Thr Lys Val Phe Leu Ile Asp Asn Leu Asp Thr Ser Ala
 20 25 30
 Ala Asn Arg Glu Asp Gln Arg Ala Phe His Arg Met Met Thr Gly Leu
 35 40 45
 Arg Val Glu Leu Val Pro Lys Leu Asp His Thr Leu Gln Ser Pro Trp
 50 55 60
 Glu Ile Ala Ala Gln Trp Val Val Pro Arg Glu Val Tyr Pro Glu Glu
 65 70 75 80
 Thr Pro Glu Leu Gly Ala Ile Met His Ala Met Ala Thr Lys Lys Ile
 85 90 95
 Ile Lys Ala Asp Val Gly Tyr Lys Gly Thr Gln Leu Lys Ala Leu Leu
 100 105 110
 Ile Leu Glu Gly Gly Gln Lys Val Val Phe Lys Pro Lys Arg Tyr Ser
 115 120 125
 Arg Asp Tyr Val Val Glu Gly Glu Pro Tyr Ala Gly Tyr Asp Arg His
 130 135 140
 Asn Ala Glu Val Ala Ala Phe His Leu Asp Arg Ile Leu Gly Phe Arg
 145 150 155 160
 Arg Ala Pro Leu Val Val Gly Arg Tyr Val Asn Leu Arg Thr Glu Val
 165 170 175
 Lys Pro Val Ala Thr Glu Gln Leu Leu Ser Thr Phe Leu Thr Val Gly
 180 185 190
 Asn Asn Thr Cys Phe Tyr Gly Lys Cys Tyr Tyr Cys Arg Glu Thr Glu
 195 200 205
 Pro Ala Cys Ala Asp Gly Asp Met Met Glu Gly Ser Val Thr Leu Trp
 210 215 220
 Leu Pro Asp Val Trp Pro Leu Gln Lys His Arg His Pro Trp Gly Arg
 225 230 235 240
 Thr Tyr Arg Glu Gly Lys Leu Ala Arg Trp Glu Tyr Asp Glu Ser Tyr
 245 250 255
 Cys Asp Ala Val Lys Lys Thr Ser Pro Tyr Asp Ser Gly Pro Arg Leu
 260 265 270
 Leu Asp Ile Ile Asp Thr Ala Val Phe Asp Tyr Leu Ile Gly Asn Ala
 275 280 285
 Asp Arg His His Tyr Glu Ser Phe Gln Asp Asp Glu Gly Ala Ser Met
 290 295 300
 Leu Ile Leu Leu Asp Asn Ala Lys Ser Phe Gly Asn Pro Ser Leu Asp
 305 310 315 320
 Glu Arg Ser Ile Leu Ala Pro Leu Tyr Gln Cys Cys Ile Ile Arg Val
 325 330 335
 Ser Thr Trp Asn Arg Leu Asn Tyr Leu Lys Asn Gly Val Leu Lys Ser

			340					345					350				
Ala	Leu	Lys	Ser	Ala	Met	Ala	His	Asp	Pro	Ile	Ser	Pro	Val	Leu	Ser		
		355					360					365					
Asp	Pro	His	Leu	Asp	Thr	Val	Asp	Gln	Arg	Leu	Leu	Asn	Val	Leu	Ala		
	370					375					380						
Thr	Ile	Lys	Gln	Cys	Thr	Asp	Gln	Phe	Gly	Thr	Asp	Thr	Val	Leu	Val		
385					390					395					400		
Glu	Asp	Arg	Met	Pro	Leu	Ser	His	Leu									
				405													

<210> 54
 <211> 697
 <212> PRT
 <213> Mouse

<400> 54

Met	Arg	Leu	Thr	Val	Gly	Ala	Leu	Leu	Ala	Cys	Ala	Ala	Leu	Gly	Leu		
1				5				10					15				
Cys	Leu	Ala	Val	Pro	Asp	Lys	Thr	Val	Lys	Trp	Cys	Ala	Val	Ser	Glu		
		20					25						30				
His	Glu	Asn	Thr	Lys	Cys	Ile	Ser	Phe	Arg	Asp	His	Met	Lys	Thr	Val		
		35				40					45						
Leu	Pro	Pro	Asp	Gly	Pro	Arg	Leu	Ala	Cys	Val	Lys	Lys	Thr	Ser	Tyr		
	50				55					60							
Pro	Asp	Cys	Ile	Lys	Ala	Ile	Ser	Ala	Ser	Glu	Ala	Asp	Ala	Met	Thr		
65				70					75					80			
Leu	Asp	Gly	Gly	Trp	Val	Tyr	Asp	Ala	Gly	Leu	Thr	Pro	Asn	Asn	Leu		
			85					90					95				
Lys	Pro	Val	Ala	Ala	Glu	Phe	Tyr	Gly	Ser	Val	Glu	His	Pro	Gln	Thr		
		100						105					110				
Tyr	Tyr	Tyr	Ala	Val	Ala	Val	Val	Lys	Lys	Gly	Thr	Asp	Phe	Gln	Leu		
	115						120					125					
Asn	Gln	Leu	Glu	Gly	Lys	Lys	Ser	Cys	His	Thr	Gly	Leu	Gly	Arg	Ser		
	130				135						140						
Ala	Gly	Trp	Val	Ile	Pro	Ile	Gly	Leu	Leu	Phe	Cys	Lys	Leu	Ser	Glu		
145				150					155					160			
Pro	Arg	Ser	Pro	Leu	Glu	Lys	Ala	Val	Ser	Ser	Phe	Phe	Ser	Gly	Ser		
			165					170						175			
Cys	Val	Pro	Cys	Ala	Asp	Pro	Val	Ala	Phe	Pro	Lys	Leu	Cys	Gln	Leu		
		180						185					190				
Cys	Pro	Gly	Cys	Gly	Cys	Ser	Ser	Thr	Gln	Pro	Phe	Phe	Gly	Tyr	Val		
	195					200						205					
Gly	Ala	Phe	Lys	Cys	Leu	Lys	Asp	Gly	Gly	Gly	Asp	Val	Ala	Phe	Val		
	210				215						220						
Lys	His	Thr	Thr	Ile	Phe	Glu	Val	Leu	Pro	Glu	Lys	Ala	Asp	Arg	Asp		
225				230					235					240			
Gln	Tyr	Glu	Leu	Leu	Cys	Leu	Asp	Asn	Thr	Arg	Lys	Pro	Val	Asp	Gln		
			245					250						255			
Tyr	Glu	Asp	Cys	Tyr	Leu	Ala	Arg	Ile	Pro	Ser	His	Ala	Val	Val	Ala		
		260					265						270				
Arg	Lys	Asn	Asn	Gly	Lys	Glu	Asp	Leu	Ile	Trp	Glu	Ile	Leu	Lys	Val		
	275					280						285					
Ala	Gln	Glu	His	Phe	Gly	Lys	Gly	Lys	Ser	Lys	Asp	Phe	Gln	Leu	Phe		
	290				295						300						
Ser	Ser	Pro	Leu	Gly	Lys	Asp	Leu	Leu	Phe	Lys	Asp	Ser	Ala	Phe	Gly		
305				310					315					320			
Leu	Leu	Arg	Val	Pro	Pro	Arg	Met	Asp	Tyr	Arg	Leu	Tyr	Leu	Gly	His		

Asn	Tyr	Val	Thr	Ala	Ile	Arg	Asn	Gln	Gln	Glu	Gly	Val	Cys	Pro	Glu
			340					345					350		
Gly	Ser	Ile	Asp	Asn	Ser	Pro	Val	Lys	Trp	Cys	Ala	Leu	Ser	His	Leu
		355					360					365			
Glu	Arg	Thr	Lys	Cys	Asp	Glu	Trp	Ser	Ile	Ile	Ser	Glu	Gly	Lys	Ile
	370					375					380				
Glu	Cys	Glu	Ser	Ala	Glu	Thr	Thr	Glu	Asp	Cys	Ile	Glu	Lys	Ile	Val
385					390					395					400
Asn	Gly	Glu	Ala	Asp	Ala	Met	Thr	Leu	Asp	Gly	Gly	His	Ala	Tyr	Ile
			405					410						415	
Ala	Gly	Gln	Cys	Gly	Leu	Val	Pro	Val	Met	Ala	Glu	Tyr	Tyr	Glu	Ser
			420				425						430		
Ser	Asn	Cys	Ala	Ile	Pro	Ser	Gln	Gln	Gly	Ile	Phe	Pro	Lys	Gly	Tyr
	435						440					445			
Tyr	Ala	Val	Ala	Val	Val	Lys	Ala	Ser	Asp	Thr	Ser	Ile	Thr	Trp	Asn
	450					455					460				
Asn	Leu	Lys	Gly	Lys	Lys	Ser	Cys	His	Thr	Gly	Val	Asp	Arg	Thr	Ala
465					470					475					480
Gly	Trp	Asn	Ile	Pro	Met	Gly	Met	Leu	Tyr	Asn	Arg	Ile	Asn	His	Cys
			485					490						495	
Lys	Phe	Asp	Glu	Phe	Phe	Ser	Gln	Gly	Cys	Ala	Pro	Gly	Tyr	Glu	Lys
		500					505						510		
Asn	Ser	Thr	Leu	Cys	Asp	Leu	Cys	Ile	Gly	Pro	Leu	Lys	Cys	Ala	Pro
	515					520						525			
Asn	Asn	Lys	Glu	Glu	Tyr	Asn	Gly	Tyr	Thr	Gly	Ala	Phe	Arg	Cys	Leu
	530					535					540				
Val	Glu	Lys	Gly	Asp	Val	Ala	Phe	Val	Lys	His	Gln	Thr	Val	Leu	Asp
545					550					555					560
Asn	Thr	Glu	Gly	Lys	Asn	Pro	Ala	Glu	Trp	Ala	Lys	Asn	Leu	Lys	Gln
			565					570						575	
Glu	Asp	Phe	Glu	Leu	Leu	Cys	Pro	Asp	Gly	Thr	Arg	Lys	Pro	Val	Lys
		580						585					590		
Asp	Phe	Ala	Ser	Cys	His	Leu	Ala	Gln	Ala	Pro	Asn	His	Val	Val	Val
	595						600					605			
Ser	Arg	Lys	Glu	Lys	Ala	Ala	Arg	Val	Lys	Ala	Val	Leu	Thr	Ser	Gln
	610					615					620				
Glu	Thr	Leu	Phe	Gly	Gly	Ser	Asp	Cys	Thr	Gly	Asn	Phe	Cys	Leu	Phe
625				630						635					640
Lys	Ser	Thr	Thr	Lys	Asp	Leu	Leu	Phe	Arg	Asp	Asp	Thr	Lys	Cys	Phe
			645						650					655	
Val	Lys	Leu	Pro	Glu	Gly	Thr	Thr	Pro	Glu	Lys	Tyr	Leu	Gly	Ala	Glu
		660						665					670		
Tyr	Met	Gln	Ser	Val	Gly	Asn	Met	Arg	Lys	Cys	Ser	Thr	Ser	Arg	Leu
	675					680						685			
Leu	Glu	Ala	Cys	Thr	Phe	His	Lys	His							
	690					695									

<210> 55

<211> 400

<212> PRT

<213> Mouse

<400> 55

Gly	Ala	Pro	Thr	Pro	Ala	Tyr	Val	Arg	Ser	Ala	Arg	Arg	Thr	Glu	Pro
1				5				10						15	
Leu	Ala	Ser	Gly	Ala	Arg	Ser	Arg	Leu	Cys	Gln	Cys	Arg	Arg	Val	Pro

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<210> 56
<211> 174
<212> PRT
<213> Mouse
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Met Pro Ala Cys Arg Leu Cys Leu Leu Ala Ala Gly Leu Leu Leu Gly
1 5 10 15
Leu Leu Leu Phe Thr Pro Ile Ser Ala Thr Gly Thr Asp Ala Glu Lys

Pro	Gly	Glu	Cys	Pro	Gln	Leu	Glu	Pro	Ile	Thr	Asp	Cys	Val	Leu	Glu
		35					40					45			
Cys	Thr	Leu	Asp	Lys	Asp	Cys	Ala	Asp	Asn	Arg	Lys	Cys	Cys	Gln	Ala
	50					55					60				
Gly	Cys	Ser	Ser	Val	Cys	Ser	Lys	Pro	Asn	Gly	Pro	Ser	Glu	Gly	Glu
	65				70					75					80
Leu	Ser	Gly	Thr	Asp	Thr	Lys	Leu	Ser	Glu	Thr	Gly	Thr	Thr	Thr	Gln
			85						90					95	
Ser	Ala	Gly	Leu	Asp	His	Thr	Thr	Lys	Pro	Pro	Gly	Gly	Gln	Val	Ser
			100					105					110		
Thr	Lys	Pro	Pro	Ala	Val	Thr	Arg	Glu	Gly	Leu	Gly	Val	Arg	Glu	Lys
		115					120					125			
Gln	Gly	Thr	Cys	Pro	Ser	Val	Asp	Ile	Pro	Lys	Leu	Gly	Leu	Cys	Glu
	130					135					140				
Asp	Gln	Cys	Gln	Val	Asp	Ser	Gln	Cys	Ser	Gly	Asn	Met	Lys	Cys	Cys
	145				150					155					160
Arg	Asn	Gly	Cys	Gly	Lys	Met	Ala	Cys	Thr	Thr	Pro	Lys	Phe		
				165					170						

<210> 57
 <211> 173
 <212> PRT
 <213> Mouse

Val	Arg	Asn	Gly	Asp	Leu	Phe	Phe	Lys	Lys	Val	Gln	Val	Glu	Asp	Gly
1				5				10					15		
Gly	Val	Tyr	Thr	Cys	Tyr	Ala	Met	Gly	Glu	Thr	Phe	Asn	Glu	Thr	Leu
			20					25					30		
Ser	Val	Glu	Leu	Lys	Val	Tyr	Asn	Phe	Thr	Leu	His	Gly	His	His	Asp
		35					40					45			
Thr	Leu	Asn	Thr	Ala	Tyr	Thr	Thr	Leu	Val	Gly	Cys	Ile	Leu	Ser	Val
	50					55					60				
Val	Leu	Val	Leu	Ile	Tyr	Leu	Tyr	Leu	Thr	Pro	Cys	Arg	Cys	Trp	Cys
	65				70				75						80
Arg	Gly	Val	Glu	Lys	Pro	Ser	Ser	His	Gln	Gly	Asp	Ser	Leu	Ser	Ser
				85				90					95		
Ser	Met	Leu	Ser	Thr	Thr	Pro	Asn	His	Asp	Pro	Met	Ala	Gly	Gly	Asp
			100				105						110		
Lys	Asp	Asp	Gly	Phe	Asp	Arg	Arg	Val	Ala	Phe	Leu	Glu	Pro	Ala	Gly
		115					120					125			
Pro	Gly	Gln	Gly	Gln	Asn	Gly	Lys	Leu	Lys	Pro	Gly	Asn	Thr	Leu	Pro
	130					135					140				
Val	Pro	Glu	Ala	Thr	Gly	Lys	Gly	Gln	Arg	Arg	Met	Ser	Asp	Pro	Glu
	145				150				155						160
Ser	Val	Ser	Ser	Val	Phe	Ser	Asp	Thr	Pro	Ile	Val	Val			
				165				170							

<210> 58
 <211> 88
 <212> PRT
 <213> Mouse

Met	Glu	Glu	Ile	Thr	Cys	Ala	Phe	Leu	Leu	Leu	Ala	Gly	Leu	Pro
1				5				10				15		

Ala Leu Glu Ala Ser Asp Pro Val Asp Lys Asp Ser Pro Phe Tyr Tyr
 20 25 30
 Asp Trp Glu Ser Leu Gln Leu Gly Gly Leu Ile Phe Gly Gly Leu Leu
 35 40 45
 Cys Ile Ala Gly Ile Ala Met Ala Leu Ser Gly Lys Cys Lys Cys Arg
 50 55 60
 Arg Thr His Lys Pro Ser Ser Leu Pro Gly Lys Ala Thr Pro Leu Ile
 65 70 75 80
 Ile Pro Gly Ser Ala Asn Thr Cys
 85

<210> 59
 <211> 171
 <212> PRT
 <213> Mouse

<400> 59
 Leu Ser Val Val Leu Gly Gly Thr Leu Tyr Ile Gly His Tyr Leu Ala
 1 5 10 15
 Met Tyr Ser Glu Gly Ala Pro Phe Trp Thr Gly Ile Val Ala Met Leu
 20 25 30
 Ala Gly Ala Val Ala Phe Leu His Lys Lys Arg Gly Gly Thr Cys Trp
 35 40 45
 Ala Leu Met Arg Thr Leu Leu Val Leu Ala Ser Phe Cys Thr Ala Val
 50 55 60
 Ala Ala Ile Val Ile Gly Ser Arg Glu Leu Asn Tyr Tyr Trp Tyr Phe
 65 70 75 80
 Leu Gly Asp Asp Val Cys Gln Arg Asp Ser Ser Tyr Gly Trp Ser Thr
 85 90 95
 Met Pro Arg Thr Thr Pro Val Pro Glu Glu Ala Asp Arg Ile Ala Leu
 100 105 110
 Cys Ile Tyr Tyr Thr Ser Met Leu Lys Thr Leu Leu Met Ser Leu Gln
 115 120 125
 Ala Met Leu Leu Gly Ile Trp Val Leu Leu Leu Leu Ala Ser Leu Thr
 130 135 140
 Pro Val Cys Val Tyr Ile Trp Lys Arg Phe Phe Thr Lys Ala Glu Thr
 145 150 155 160
 Glu Glu Lys Lys Leu Leu Gly Ala Ala Val Ile
 165 170

<210> 60
 <211> 318
 <212> PRT
 <213> Mouse

<400> 60
 Met Leu Gln His Thr Ser Leu Val Leu Leu Leu Ala Ser Ile Trp Thr
 1 5 10 15
 Thr Arg His Pro Val Gln Gly Ala Asp Leu Val Gln Asp Leu Ser Ile
 20 25 30
 Ser Thr Cys Arg Ile Met Gly Val Ala Leu Val Gly Arg Asn Lys Asn
 35 40 45
 Pro Gln Met Asn Phe Thr Glu Ala Asn Glu Ala Cys Lys Met Leu Gly
 50 55 60
 Leu Thr Leu Ala Ser Arg Asp Gln Val Glu Ser Ala Gln Lys Ser Gly
 65 70 75 80
 Phe Glu Thr Cys Ser Tyr Gly Trp Val Gly Glu Gln Phe Ser Val Ile

Leu Leu Phe Cys Tyr Ala Leu Arg Lys Ala Gly Gly Asp Ile Arg Val
 20 25 30
 Leu Val Pro Tyr Asn Ser Thr Gly Val Leu Gly Gly Ser Thr Thr Leu
 35 40 45
 His Cys Ser Leu Thr Ser Asn Glu Asn Val Thr Ile Thr Gln Ile Thr
 50 55 60
 Trp Met Lys Lys Asp Ser Gly Gly Ser His Ala Leu Val Ala Val Phe
 65 70 75 80
 His Pro Lys Lys Gly Pro Asn Ile Lys Glu Pro Glu Arg Val Lys Phe
 85 90 95
 Leu Ala Ala Gln Gln Asp Leu Arg Asn Ala Ser Leu Ala Ile Ser Asn
 100 105 110
 Leu Ser Val Glu Asp Glu Gly Ile Tyr Glu Cys Gln Ile Ala Thr Phe
 115 120 125
 Pro Arg Gly Ser Arg Ser Thr Asn Ala Trp Leu Lys Val Gln Ala Arg
 130 135 140
 Pro Lys Asn Thr Ala Glu Ala Leu Glu Pro Ser Pro Thr Leu Ile Leu
 145 150 155 160
 Gln Asp Val Ala Lys Cys Ile Ser Ala Asn Gly His Pro Pro Gly Arg
 165 170 175
 Ile Ser Trp Pro Ser Asn Val Asn Gly Ser His Arg Glu Met Lys Glu
 180 185 190
 Pro Gly Ser Gln Pro Gly Thr Thr Thr Val Thr Ser Tyr Leu Ser Met
 195 200 205
 Val Pro Ser Arg Gln Ala Asp Gly Lys Asn Ile Thr Cys Thr Val Glu
 210 215 220
 His Glu Ser Leu Gln Glu Leu Asp Gln Leu Leu Val Thr Leu Ser Gln
 225 230 235 240
 Pro Tyr Pro Pro Glu Asn Val Ser Ile Ser Gly Tyr Asp Gly Asn Trp
 245 250 255
 Tyr Val Gly Leu Thr Asn Leu Thr Leu Thr Cys Glu Ala His Ser Lys
 260 265 270
 Pro Ala Pro Asp Met Ala Gly Tyr Asn Trp Ser Thr Asn Thr Gly Asp
 275 280 285
 Phe Pro Asn Ser Val Lys Arg Gln Gly Asn Met Leu Leu Ile Ser Thr
 290 295 300
 Val Glu Asp Gly Leu Asn Asn Thr Val Ile Val Cys Glu Val Thr Asn
 305 310 315 320
 Ala Leu Gly Ser Gly Gln Gly Gln Val His Ile Ile Val Lys Glu Lys
 325 330 335
 Pro Glu Asn Met Gln Gln Asn Thr Arg Leu His Leu Gly Tyr Ile Phe
 340 345 350
 Leu Ile Val Phe Val Leu Ala Val Val Ile Ile Ile Ala Ala Leu Tyr
 355 360 365
 Thr Ile Arg Arg Cys Arg His Gly Arg Ala Leu Gln Ser Asn Pro Ser
 370 375 380
 Glu Arg Glu Asn Val Gln Tyr Ser Ser Val Asn Gly Asp Cys Arg Leu
 385 390 395 400
 Asn Met Glu Pro Asn Ser Thr Arg
 405

<210> 63
 <211> 278
 <212> PRT
 <213> Mouse

<400> 63

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Met Phe Leu Val Gly Ser Leu Val Val Leu Cys Gly Leu Leu Ala His
 1      5      10      15
Ser Thr Ala Gln Leu Ala Gly Leu Pro Leu Pro Leu Gly Gln Gly Pro
      20      25      30
Pro Leu Pro Leu Asn Gln Gly Pro Pro Leu Pro Leu Asn Gln Gly Gln
      35      40      45
Leu Leu Pro Leu Ala Gln Gly Leu Pro Leu Ala Val Ser Pro Ala Leu
      50      55      60
Pro Ser Asn Pro Thr Asp Leu Leu Ala Gly Lys Phe Thr Asp Ala Leu
65      70      75      80
Ser Gly Gly Leu Leu Ser Gly Gly Leu Leu Gly Ile Leu Glu Asn Ile
      85      90      95
Pro Leu Leu Asp Val Ile Lys Ser Gly Gly Gly Asn Ser Asn Gly Leu
      100      105      110
Val Gly Gly Leu Leu Gly Lys Leu Thr Ser Ser Val Pro Leu Leu Asn
      115      120      125
Asn Ile Leu Asp Ile Lys Ile Thr Asp Pro Gln Leu Leu Glu Leu Gly
      130      135      140
Leu Val Gln Ser Pro Asp Gly His Arg Leu Tyr Val Thr Ile Pro Leu
145      150      155      160
Gly Leu Thr Leu Asn Val Asn Met Pro Val Val Gly Ser Leu Leu Gln
      165      170      175
Leu Ala Val Lys Leu Asn Ile Thr Ala Glu Val Leu Ala Val Lys Asp
      180      185      190
Asn Gln Gly Arg Ile His Leu Val Leu Gly Asp Cys Thr His Ser Pro
      195      200      205
Gly Ser Leu Lys Ile Ser Leu Leu Asn Gly Val Thr Pro Val Gln Ser
      210      215      220
Phe Leu Asp Asn Leu Thr Gly Ile Leu Thr Lys Val Leu Pro Glu Leu
225      230      235      240
Ile Gln Gly Lys Val Cys Pro Leu Val Asn Gly Ile Leu Ser Gly Leu
      245      250      255
Asp Val Thr Leu Val His Asn Ile Ala Glu Leu Leu Ile His Gly Leu
      260      265      270
Gln Phe Val Ile Lys Val
      275

```

<210> 64

<211> 264

<212> PRT

<213> Mouse

<400> 64

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Met Ala Thr Thr Thr Cys Gln Val Val Gly Leu Leu Leu Ser Leu Leu
 1      5      10      15
Gly Leu Ala Gly Cys Ile Ala Ala Thr Gly Met Asp Met Trp Ser Thr
      20      25      30
Gln Asp Leu Tyr Asp Asn Pro Val Thr Ala Val Phe Gln His Glu Gly
      35      40      45
Leu Trp Arg Ser Cys Val Gln Ser Ser Gly Phe Thr Glu Cys Arg
      50      55      60
Pro Tyr Phe Thr Ile Leu Gly Leu Pro Ala Met Leu Gln Ala Val Arg
65      70      75      80
Ala Leu Met Ile Val Gly Ile Val Leu Gly Val Ile Gly Ile Leu Val
      85      90      95
Ser Ile Phe Ala Leu Lys Cys Ile Arg Ile Gly Ser Met Asp Asp Ser
      100      105      110

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Ala Lys Ala Lys Met Thr Leu Thr Ser Gly Ile Leu Phe Ile Ile Ser
 115 120 125
 Gly Ile Cys Ala Ile Ile Gly Val Ser Val Phe Ala Asn Met Leu Val
 130 135 140
 Thr Asn Phe Trp Met Ser Thr Ala Asn Met Tyr Ser Gly Met Gly Gly
 145 150 155 160
 Met Gly Gly Met Val Gln Thr Val Gln Thr Arg Tyr Thr Phe Gly Ala
 165 170 175
 Ala Leu Phe Val Gly Trp Val Ala Gly Gly Leu Thr Leu Ile Gly Gly
 180 185 190
 Val Met Met Cys Ile Ala Cys Arg Gly Leu Thr Pro Asp Asp Ser Asn
 195 200 205
 Phe Lys Ala Val Ser Tyr His Ala Ser Gly Gln Asn Val Ala Tyr Arg
 210 215 220
 Pro Gly Gly Phe Lys Ala Ser Thr Gly Phe Gly Ser Asn Thr Arg Asn
 225 230 235 240
 Lys Lys Ile Tyr Asp Gly Gly Ala Arg Thr Glu Asp Asp Glu Gln Ser
 245 250 255
 His Pro Thr Lys Tyr Asp Tyr Val
 260

<210> 65
 <211> 132
 <212> PRT
 <213> Mouse

<400> 65
 Ala His Pro Arg Pro Gly Ala Arg Arg Pro Arg Leu Leu Ala Phe Gln
 1 5 10 15
 Ala Ser Cys Ala Pro Ala Pro Gly Ser Arg Asp Arg Cys Pro Glu Glu
 20 25 30
 Gly Gly Pro Arg Cys Leu Arg Val Tyr Ala Gly Leu Ile Gly Thr Val
 35 40 45
 Val Thr Pro Asn Tyr Leu Asp Asn Val Ser Ala Arg Val Ala Pro Trp
 50 55 60
 Cys Gly Cys Ala Ala Ser Gly Asn Arg Arg Glu Glu Cys Glu Ala Phe
 65 70 75 80
 Arg Lys Leu Phe Thr Arg Asn Pro Cys Leu Asp Gly Ala Ile Gln Ala
 85 90 95
 Phe Asp Ser Leu Gln Pro Ser Val Leu Gln Asp Gln Thr Ala Gly Cys
 100 105 110
 Cys Phe Pro Arg Val Ser Trp Leu Tyr Ala Leu Thr Ala Leu Ala Leu
 115 120 125
 Gln Ala Leu Leu
 130

<210> 66
 <211> 764
 <212> DNA
 <213> Mouse

<400> 66
 gcagcaccga gcgccaagcg caccaggcac cgcgacagac ggcaggagca cccatcgacg 60
 ggcgtactgg agcgagccga gcagagcaga gagaggcgtg cttgaaaccg agaaccaagc 120
 cgggcggcat cccccggccg ccgcacgcac aggcggcgcc cctccttgcc tccctgctcc 180
 ccaccgcgcc cctccggcca gcatgaggct cctggcggcc gcgctgctcc tgctgctcct 240
 ggcgctgtgc gcctcgcgcg tggacgggtc caagtgtgtaag tggtcccga aggggcccaa 300

gatccgctac	agcgacgtga	agaagctgga	aatgaagcca	aagtacccac	actgcgagga	360
gaagatggtt	atcgtcacca	ccaagagcat	gtccaggtac	cggggccagg	agcactgcct	420
gcaccctaag	ctgcagagca	ccaacgcctt	catcaagtgg	tacaatgcct	ggaacgagaa	480
gcgcaggggtc	tacgaagaat	agggtggacg	atcatggaaa	gaaaaactcc	aggccagttg	540
agagacttca	gcagaggact	ttgcagatta	aaataaaaagc	cctttctttc	tcacaagcat	600
aagacaaatt	atatattgct	atgaagctct	tcttaccagg	gtcagttttt	acattttata	660
gctgtgtgtg	aaaggcttcc	agatgtgaga	tccagctcgc	ctgcgcacca	gacttcatta	720
caagtggctt	tttgctgggc	ggttggcggg	gggcgggggg	acct		764

<210> 67
 <211> 288
 <212> DNA
 <213> Human

<400> 67	
gcggccgcgc	tgctcctgct
tgcaagtgct	cccggaagg
aagccaaagt	acccgcactg
aggtagcgag	gtcaggagca
aagtggtaga	acgcctggaa
	cgagaagcgc
	agggtctacg
	aagaatag
	60
	120
	180
	240
	288

<210> 68
 <211> 95
 <212> PRT
 <213> Human

<400> 68	
Ala Ala Ala	Leu Leu Leu Leu Leu Leu Ala Leu Tyr Thr Ala Arg Val
1	5 10 15
Asp Gly Ser	Lys Cys Lys Cys Ser Arg Lys Gly Pro Lys Ile Arg Tyr
	20 25 30
Ser Asp Val	Lys Lys Leu Glu Met Lys Pro Lys Tyr Pro His Cys Glu
	35 40 45
Glu Lys Met	Val Ile Ile Thr Thr Lys Ser Val Ser Arg Tyr Arg Gly
	50 55 60
Gln Glu His	Cys Leu His Pro Lys Leu Gln Ser Thr Lys Arg Phe Ile
65	70 75 80
Lys Trp Tyr	Asn Ala Trp Asn Glu Lys Arg Arg Val Tyr Glu Glu
	85 90 95

<210> 69
 <211> 234
 <212> DNA
 <213> Mouse

<400> 69	
tccaagtgtg	agtgttcccg
gaaatgaagc	caaagtaccc
atgtccaggt	accggggcca
ttcatcaagt	ggtacaatgc
	ctggaacgag
	aagcgcaggg
	tctacgaaga
	atag
	60
	120
	180
	234

<210> 70
 <211> 77
 <212> PRT
 <213> Mouse

<400> 70

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Ser Lys Cys Lys Cys Ser Arg Lys Gly Pro Lys Ile Arg Tyr Ser Asp
 1           5           10           15
Val Lys Lys Leu Glu Met Lys Pro Lys Tyr Pro His Cys Glu Glu Lys
      20           25           30
Met Val Ile Val Thr Thr Lys Ser Met Ser Arg Tyr Arg Gly Gln Glu
      35           40           45
His Cys Leu His Pro Lys Leu Gln Ser Thr Lys Arg Phe Ile Lys Trp
      50           55           60
Tyr Asn Ala Trp Asn Glu Lys Arg Arg Val Tyr Glu Glu
65           70           75

```

<210> 71
 <211> 234
 <212> DNA
 <213> Human

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<400> 71
tccaaatgca agtgctcccg gaagggaccc aagatccgct acagcgacgt gaagaagctg      60
gaaatgaagc caaagtaccc gcactgcgag gagaagatgg ttatcatcac caccaagagc      120
gtgtccaggt accgaggtca ggagcactgc ctgcacccca agctgcagag caccaagcgc      180
ttcatcaagt ggtacaacgc ctggaacgag aagcgcaggg tctacgaaga atag          234

```

<210> 72
 <211> 77
 <212> PRT
 <213> Human

```

<400> 72
Ser Lys Cys Lys Cys Ser Arg Lys Gly Pro Lys Ile Arg Tyr Ser Asp
 1           5           10           15
Val Lys Lys Leu Glu Met Lys Pro Lys Tyr Pro His Cys Glu Glu Lys
      20           25           30
Met Val Ile Ile Thr Thr Lys Ser Val Ser Arg Tyr Arg Gly Gln Glu
      35           40           45
His Cys Leu His Pro Lys Leu Gln Ser Thr Lys Arg Phe Ile Lys Trp
      50           55           60
Tyr Asn Ala Trp Asn Glu Lys Arg Arg Val Tyr Glu Glu
65           70           75

```

<210> 73
 <211> 1460
 <212> DNA
 <213> Pinus radiata

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<400> 73
aaaacgtcca tagcttcctt gccaaactgca agcaatacag tacaagagcc agacgatcga      60
atcctgtgaa gtggttctga agtgatggga agcttggaat ctgaaaaaac tgttacagga      120
tatgcagctc gggactccag tggccacttg tccccttaca cttacaatct cagaaagaaa      180
ggacctgagg atgtaattgt aaaggtcatt tactgcggaa tctgccactc tgatttagtt      240
caaatgcgta atgaaatgga catgtctcat tacccaatgg tccctgggca tgaagtgggtg      300
gggattgtaa cagagattgg cagcgagggtg aagaaattca aagtgggaga gcatgtaggg      360
gttggttgca ttgttgggtc ctgtcgaggt tgcggttaatt gcaatcagag catggaacaa      420
tactgcagca agaggatttg gacctacaat gatgtgaacc atgacggcac acctactcag      480
ggcggatttg caagcagtat ggtggttgat cagatgtttg tggttcgaat cccggagaat      540
cttcctctgg aacaagcggc ccctctgtta tgtgcagggg ttacagtttt cagcccaatg      600
aagcatttcg ccatgacaga gcccggaag aaatgtggga ttttgggttt aggaggcgtg      660
gggcacatgg gtgtcaagat tgccaaagcc tttggactcc acgtgacggt tatcagttcg      720

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ00/00256

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: C12N 15/11

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

SEE ELECTRONIC DATA BASES

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SEE ELECTRONIC DATA BASES

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EMBL, GenBank, PIR, GenePept: Sequence IDs 1, 36, 2, 37, 3, 38, 4, 39, 5, 40

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GenBank Accession No. AL034558 28 July 1999 Whole Sequence w.r.t. Sequence ID 3	1 - 14
X	GenPept Accession No. CAA29045 21 March 1995 Whole Sequence Frame +2 w.r.t. Sequence ID 4	1 - 14
X	GenBank Accession No. AR018857 5 December 1998 & US 5783182 Whole Sequence w.r.t. Sequence ID 5	1 - 14

☒ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 28 March 2001	Date of mailing of the international search report 29.03.2001
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized officer CRAIG ALLATT Telephone No : (02) 6283 2414

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ00/00256

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GenPept Accession No. CAB40181 14 December 1999 Whole Sequence w.r.t. Sequence ID 40	1 - 14

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ00/00256

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos :
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See Supplemental Box

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
Claims I - 14 partially.(See Supplemental Box)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ00/00256

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: II

In the present application, the feature that all sequences come from "mammalian sources" does not provide a special technical feature. Genes and their expressed proteins from "mammalian sources" have been sequenced. Cells from "mammalian sources" comprise a variety of different animals and cell types. Moreover the applicant has provided no evidence that the nucleotide sequences of the present application, and the peptides they express, form a unique group of protein types. On the contrary, putative peptides derived from the nucleotide sequences of the application have functions assigned on the basis of their similarity to known proteins expressed by a variety of cell types.

The applicant has grouped the polynucleotides of the application into activity categories according to putative functions of the proteins they encode. However, most of the applicants' groupings do not form a homogenous set of proteins either in structure or function. Moreover, it is noted that most of the peptides encoded by the polynucleotides are assigned to more than one activity category.

The ISA considers that each nucleotide/peptide sequence pair (defined in Table 1 pages 8 - 19) comprises one invention and that there are 35 different inventions (the inventions being numbered sequentially).

However, as a service to the applicants, the ISA will search the first five inventions without inviting additional search fees.

Therefore the ISA has searched SEQ IDs 1, 36, 2, 37, 3, 38, 4, 39, 5, and 40.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/NZ00/00256

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	5783182	AU	11609/97	CA	2237929	EP	870057
		WO	9718454				
END OF ANNEX							